Biro za projektovanje i inženjering
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mob.: 065/364-99-13
e-mail: kakkproject@gmail.com

2.1. NASLOVNA STRANA IDEJNOG PROJEKTA: SVESKA KONSTRUKCIJE

2 - PROJEKAT KONSTRUKCIJE	
INVESTITOR:	**SHANDONG LUQIAO GROUP CO. LTD** Ogranak Beograd – Novi Beograd Trg prijateljstva Srbije i Kine br. 4, Beograd – Novi Beograd
OBJEKAT:	**Privremeni kamp sa betonskim pogonom (P)** kat.parc.br. 6170, 6171, 6172, 6173, 6174/1, 6174/4 i 6174/6; K.O. B. Topola
VRSTA TEHNIČKE DOKUMENTACIJE:	**IDP – IDEJNI PROJEKAT**
NAZIV I OZNAKA DELA PROJEKTA:	2 – PROJEKAT KONSTRUKCIJE
ZA GRAĐENJE/IZVOĐENJE RADOVA:	NOVA GRADNJA
PROJEKTANT:	BIRO ZA PROJEKTOVANJE I INŽENJERING **"KAKKK PROJECT"** CARA DUŠANA 2G/II/9, TEMERIN
ODGOVORNO LICE PROJEKTANTA:	**IMRE KEKENJ**
PEČAT:	POTPIS:
IMRE KEKENJ PR BIRO ZA PROJEKTOVANJE I INŽENJERING KAKKK PROJECT TEMERIN	Kekenj Imre
ODGOVORNI PROJEKTANT:	**IMRE KEKENJ mast. inž. građ.**
BROJ LICENCE:	310 P025 16
LIČNI PEČAT:	POTPIS:
ИНЖЕЊЕРСКА КОМОРА СРБИЈЕ Имре И. Кекењ дипл. инж. грађ. 310 P025 16 ОДГОВОРНИ ПРОЈЕКТАНТ	Kekenj Imre
BROJ TEHNIČKE DOKUMENTACIJE:	51 - IDP/2022
MESTO I DATUM:	Temerin, Mart 2022 god.

Kakk PROJECT

Biro za projektovanje i inženjering

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2.2. SADRŽAJ PROJEKTA KONSTRUKCIJE IDEJNOG PROJEKTA

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Biro za projektovanje i inženjering

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2.3. REŠENJE O ODREĐIVANJU ODGOVORNOG PROJEKTANTA

Na osnovu člana 128a Zakona o planiranju i izgradnji ("Sl. glasnik RS", br. 72/09, 81/09 – ispravka, 64/10 – US, 24/11, 121/12, 42/13–US, 50/13–US, 98/13–US, 132/14, 145/14, 83/18, 31/19 i 37/19 – dr. Zakon, 9/2020 i 52/2021) i odredbi Pravilnika o sadržini, načinu i postupku izrade i načinu vršenja kontrole tehničke dokumentacije prema klasi i nameni objekata ("Službeni glasnik RS", broj 73/2019) kao:

ODGOVORNI PROJEKTANT

Za izradu projekta konstrukcije, koji je deo Idejnog projekta (IDP),
za izgradnju **Privremenog kampa sa betonskim pogonom (P),**
na kat.parc.br. 6170, 6171, 6172, 6173, 6174/1, 6174/4 i 6174/6; K.O. B. Topola određuje se:

Imre Kekenj mast. inž. građ.

br. licence 310 P025 16

PROJEKTANT:	BIRO ZA PROJEKTOVANJE I INŽENJERING **"KAKKK PROJECT"** CARA DUŠANA 2G/II/9, TEMERIN
ODGOVORNO LICE/ZASTUPNIK	**IMRE KEKENJ mast.inž.građ.**
PEČAT:	POTPIS:
IMRE KEKENJ PR BIRO ZA PROJEKTOVANJE I INŽENJERING KAKKK PROJECT TEMERIN	Kekenj Imre
BROJ TEHNIČKE DOKUMENTACIJE:	51 - IDP/2022
MESTO I DATUM:	Temerin, Mart 2022 god.

Biro za projektovanje i inženjering
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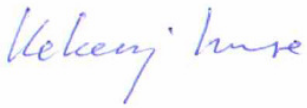
2.4. IZJAVA ODGOVORNOG PROJEKTANTA PROJEKTA KONSTRUKCIJE

Odgovorni projektant projekta konstrukcije, koji je deo Idejnog projekta (IDP),
za izgradnju **Privremenog kampa sa betonskim pogonom (P),**
na kat.parc.br. 6170, 6171, 6172, 6173, 6174/1, 6174/4 i 6174/6; K.O. B. Topola

Imre Kekenj mast. inž. građ.

IZJAVLJUJEM

1. Da je projekat izrađen u skladu sa Zakonom o planiranju i izgradnji, propisima, standardima i normativima iz oblasti izgradnje objekata i pravilima struke.
2. Da je projekat u svemu u skladu sa načinima za obezbeđenje ispunjenja osnovnih zahteva za objekat propisanih elaboratima i studijama.

ODGOVORNI PROJEKTANT:	**IMRE KEKENJ mast. inž. građ.**
BROJ LICENCE:	310 P025 16
LIČNI PEČAT:	**POTPIS:**
	
BROJ TEHNIČKE DOKUMENTACIJE:	51 - IDP/2022
MESTO I DATUM:	Temerin, Mart 2022 god.

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2.5. TEKSTUALNA DOKUMENTACIJA

2.5.1. TEHNIČKI OPIS

OPŠTI PODACI O LOKACIJI

Lokacija objekta se nalazi u Opštini Bačka Topola, u industrijskoj zoni Bačke Topole, na katastarskim parcelama 6170, 6171, 6172, 6173, 6174/1, 6174/4 i 6174/6; K.O. B. Topola.
Na parceli trenutno nema postojećih objekata a prilaz parceli će biti sa puta u industrijskoj zoni.
Novi objekti privremenog kampa su raspoređeni prema tehnologiji betonske baze a prema arhitektonskom rešenju.

OPIS KLIMATSKIH USLOVA i ZONA SEIZMIČNOSTI i DRUGIH USLOVA LOKACIJE OBJEKTA

U klimatskom pogledu područje Bačke Topole ima kontinentalnu klimu koju čine oštre zime i topla leta sa relativno nestabilnim padavinama. Veliki snežni pokrivači i izraziti stalni vetrovi nisu karakteristični za ovo područje ali se povremeno poljavljuju i pri tom mogu biti izraziti. Geološki profil terena karakterističan za ovo područje u seizmičkom pogledu je povoljan i spada u područja sa malim seizmičkim intenzitetom. Predmetna lokacija se po lokalitetu nalazi u seizmičkoj zoni Z1. Na osnovu izloženog a i posmatrano geografski i upoređujući stanje u prethodnih 100 godina predmetna lokacija je van bilo kakvih rizika, kako od poplava, tako i od seizmičkih uticaja i klizišta.

PODACI O KONSTRUKCIJI OBJEKTA, USLOVIMA FUNDIRANJA, IZBOR KONSTRUKTIVNOG SISTEMA i OPIS PREDVIĐENIH MATERIJALA

Nadstrešnica armiračkog pogona je u statičkom smislu ram sa uklještenim stubovima i zglobno oslanjajućim krovnim nosačem koji ima prepuste. U podužnom pravcu stubovi su zglobno oslonjeni, krutost u podužnom pravcu obezbeđuju vertikalni spregovi. Krov je utegnut krovnim spregovima.
Objekat se fundira na temeljnim stopama dimenzija 150x100cm visine 40cm koji su međusobno spojene temeljnim gredama. Vrat temelja se izdiže 50cm do kote gotovog poda a temeljna greda se postavlja između vratova temeljnih stopa. Temelji i temeljne grede se armiraju prema statičkom proračunu i planovima armature iz grafičkih priloga PZI. Karakteristike tla su uzeti iz geomehaničkog elaborata koji je izrađen za nedaleku lokaciju. Ankeri od 4M16 k.č.8.8 stubova se ugrađuju u armaturni koš vrata temelja i betonira se temelj sa betonom C25/30. Stubovi od toplovaljanih HEA160 profila se vijčano vezuju za ubetonirane ankere koji su poravnati sa betonom. Na ovako uklještene glavne stubove se oslanja rešetkasti krovni nosač formiran od toplovaljanih HEA120 pojaseva koji su spojeni trougaonom ispunom od kutijastih 80x80x3 profila. Rešetkasta konstrukcija je predviđena iz dva montažna komada spojenim na sredini sa visokovrednim prednapregnutim zavrtnjima prema proračunu. Krovne rešetke se zglobno oslanjaju na vrh stubova i vijčano se vezuju za njih. Prepusti su poduprti kosnicima a sredina donjeg pojasa je takođe stabilizovan kosnikom. U podužnom pravcu objekat je ukrućen spregovima od kutijastih 80x80x3 profila. Preko krovnih nosača se kontinualno pružaju rožnjače od kutijastih 140x80x4 profila i ukrućeni su u ravni krova krovnim spregovima 60x60x3. Čelična konstrukcija je u kvalitetu S235, sve montažne veze su vijčane sa zavrtnjevima kvaliteta 8.8. i 10.9.

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Krovni pokrivač je čelični trapezni lim TR40 proizvođača INM Arilje ili drugi sličnih karakteristika. Vijčano se pričvršćuje za rožnjače prema uputstvima proizvođača. Zidovi su otvoreni, friz se ne zatvara. Sleme i streha objekta se opšiva limarskim opšavom u boji krovnog pokrivača, odvodnjavanje se vrši preko visećih oluka na okolnu površinu. Na krov se postavljaju i snegobrani. Gromobran se postavlja prema projektu elektroenergetskih instalacija.
Pod na zahtev Naručioca nije predmet projekta, služi za odlaganje armaturnih šipki, saobraćaja od vozila i viljuškara nema, dodatni teret se ne kači na konstrukciju. Zahtevom naručioca predviđa se pod od nabijenog betona debljine 10cm ispod kojeg je poželjno izvesti slojeve od nabijenog tucanika prema grafičkim prilozima. Ispod kamena se postavlja zbijeni pesak u potrebnoj debljini u zavisnosti od debljine skinutog sloja humusa. Apsolutna kota gotovog poda nadstrešnice je određena na visnu od 107,80m.n.v., okolni teren treba da je najmanje 10cm niži.
Objekat je bez energetskih zahteva, ne greje i ne hladi se.

Konstrukcije baraka su formirane od uklještenih stubova i krovne rešetke. Stubovi su uklješteni u temeljne trake u oba pravca hemijskim ankerima 4M16 k.č.8.8 a rešetkasti krovni nosači se zglobno oslanjaju na njih. Rešetke su formirane od kutijastih profila međusobno zavarenih po celom obimu radionički. Rožnjače se pružaju kontinualno preko krovnih nosača. Veza sa rešetkama kao i montažni nastavak je ostvaren vijčano. Krov je utegnut krovnim spregovima u krajnjim i jednom srednjem polju.

Stubove i profile na fasadi ne poželjno puniti kamenom vunom pre začepljenja profila.

Krovni pokrivač je čelični trapezni lim, odvodnjavanje preko oluka na dvorišnu površinu.

Fasadna i plafonska obloga od čeličnog sendvič panela, svi spojevi, uglovi i slična mesta opšivena limarskim opšavom u boji panela.

OPIS ETAPNOSTI I FAZNOSTI GRAĐENJA

Objekat će se graditi u jednoj fazi.

MERE ZA ISPUNJENJE OSNOVNIH ZAHTEVA ZA OBJEKAT

Predviđeni radovi na objektu se rade sa odabranim primenjenim materijalima, sistemom konstrukcije, primenjenim zahtevima i važećih standarda i zakona ispunjava sve mere u pogledu osnovnih zahteva koja mora ispunjavati svaki novoprojektovani objekat.

Temerin, Mart 2022 god.

Imre Kekenj mast. inž. građ.

(lic. br. 310 P025 16)

2.6. NUMERIČKA DOKUMENTACIJA

2.6.1. STATIČKI PRORAČUN – NADSTREŠNICA

ANALIZA OPTEREĆENJA - Nadstrešnica 20x30m

1. Stalno opterećenje:

1.1. Sopstvena težina konstrukcije - uzeto u obzir direktno kroz program
1.2. Krovni pokrivač - čelični trapezni lim TR40/245/0.5mm 0.06 kN/m² INM Arilje
1.3. Instalacije 0.10 kN/m²

2. Korisno opterećenje:
2.1. Korisno opterećenje na krovu → kategorija H p= 0.40 kN/m²

3. Povremeno opterećenje - sneg
Sneg na tlu s_k= 1.00 kN/m²
3.1. Sneg na krovu $\alpha_1 = \alpha_2 = 8°$ μ_2 = 0.80
$s = \mu_2 \times s_k$ = 0.80 kN/m²

Proračunske situacije:
1 - ravnomerno opterećenje snegom μ_2 i $\mu_2 \times s_k$
2 - neravnomerno opterećena leva strana μ_2 i $0.5 \times \mu_2 \times s_k$
3 - neravnomerno opterećena desna strana $0.5 \times \mu_2$ i $\mu_2 \times s_k$

4. Vetar - (prema SRPS EN 1991-1-4) i odgovarajući NA input
Ulazni podaci:
- Lokacija: Bačka Topola - met.stanica Subotica
- Fundamentalna osnovna brzina vetra $v_{b,0}$ = 19 m/s
- Visina objekta iznad terena z = 7.00 m
- C prob(T=50 god.) = 1,0 → $v_{b,0} \times C_{prob}$ = $v_{b,0}$ = 19.00 m/s
- Kategorija terena je II. prema tabeli 4.1 →

$z_{0,II}$ - za kat. terena II	0.05
z_{min} - minimalna visina	2.00
$z_{0,II}$ - za kat. terena II	0.05

Osnovna brzina vetra na 10m od tla: $v_b = C_{dir} * C_{season} * v_{b,0}$ = 19.00 m/s

C_{dir} = 1; C_{season} = 1 → $v_b = v_{b,0}$

Srednja (prosečna) brzina vetra: $v_{m(z)} = C_{r(z)} * C_{o(z)} * v_b$ = 13.32 m/s

- $C_{r(z)}$ - koef. hrapavosti terena: $C_{r(z)} = k_r * \ln(z/z_o)$ za $z_{min} < z \le z_{max}$ = 200m
$C_{r(z)} = C_{r(z\,min)} = k_r * \ln(z_{min} / z_0)$ za $z \le z_{min}$
z = 7.00 m > z_{min} → $C_{r(z)}$ = 0.701
- koeficijent terena - $k_r = 0.19 * (z_0/z_{0,II})^{0.07}$ = k_r = 0.190
- $C_{0(z)}$ - koeficijent topografije terena: prema aneksu A.3 → $C_{0(z)}$ = 1.00

Pritisak vetra:
- q_b - Osnovni pritisak vetra: $q_b = 1/2 * \rho * v_b^2$ = 0.226 kN/m²
- ρ - Gustina vazduha: ρ = 1.250 kg/m³
- $q_{p(z)}$ - Udarni pritisak vetra: $q_{p(z)} = [1+7*I_{v(z)}]*1/2 * \rho * v_{m(z)}^2 = C_{e(z)} * q_b$ = 0.321 kN/m² - za z_{min}
- $C_{e(z)}$ - Koeficijent izloženosti:
$C_{e(z)} = [1+(7*k_I / C_{0(z)} * \ln(z/z_0))] * k_r^2 * \ln^2(z/z_0) * C_{0(z)}^2$ = za z_{min}
- $I_{v(z)}$ - Intenzitet turbulencije: $I_{v(z)} = \sigma_v / v_{m(z)}$ za $z_{min} < z \le z_{max}$
$I_{v(z)} = I_{v(zmin)}$ za $z \le z_{min}$
z = 7.00 m > z_{min} → $I_{v(z)} = \sigma_v / v_{m(z)}$ = 0.271 za z_{min}
- σ_v - Standardna devijacija vetra: $\sigma_v = k_r * v_b * k_I$ = 3.610
- k_I - koeficijent turbulencije: k_I = 1

Referentne visine iznad terena:	z [m]	$C_{r(z)}$	$v_{m(z)}$ [m/s]	$I_{v(z)}$	$q_{p(z)}$ [kN/m2]
	5.00	0.875	16.625	0.217	0.435
	7.00	0.939	17.839	0.202	0.481

Koeficijenti spoljašnjeg i unutrašnjeg pritiska vetra $C_{p,e}$, $C_{p,i}$, $C_{p,net}$ sa odgovarajućim pritiscima:

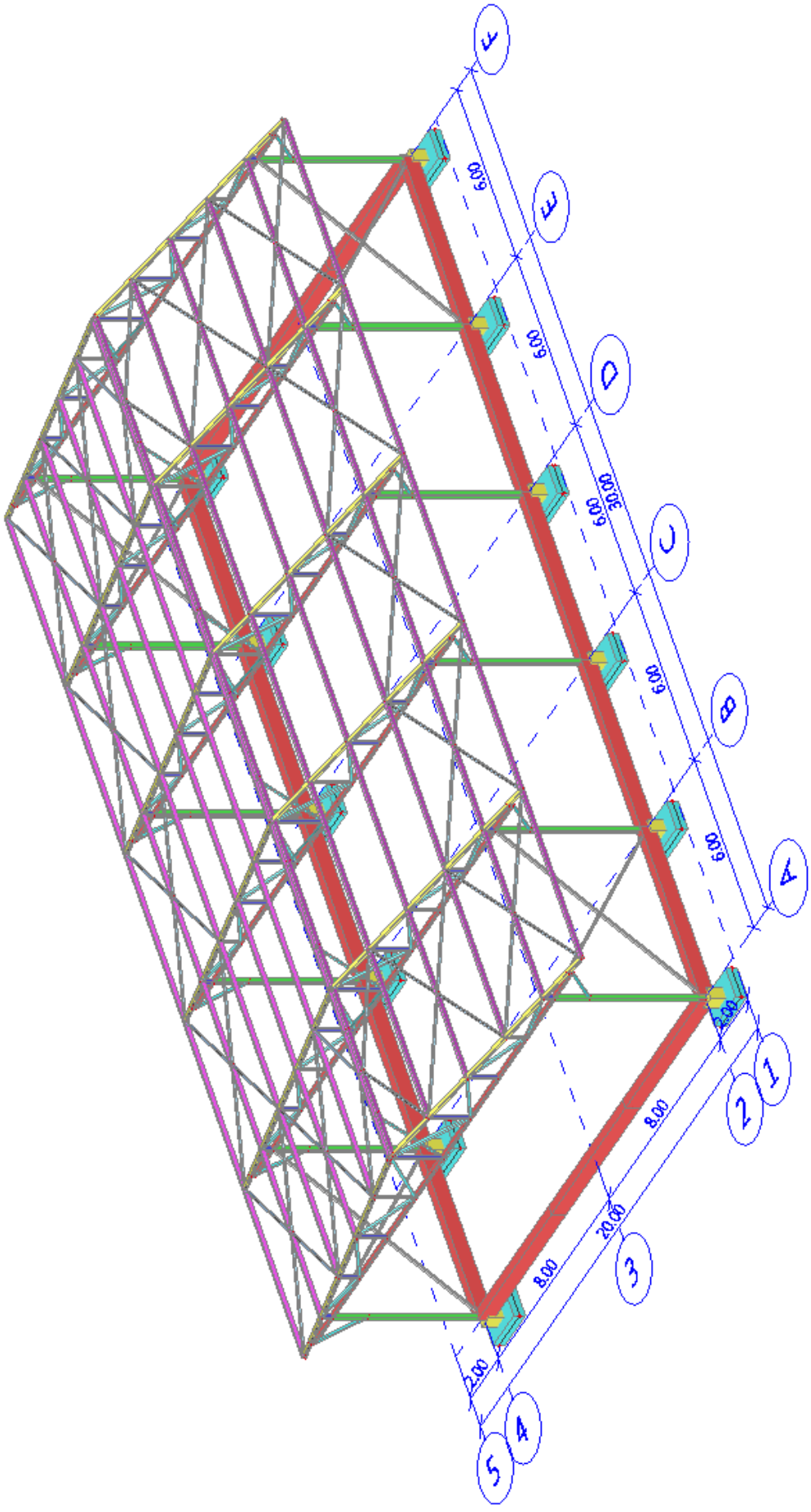
4.1. Koeficijenti neto pritiska vetra na krov prema tabeli 7.7
Za sve pravce vetra prema SRPS EN 1991-1-4 7.3 (3) za α=+10°; φ=1:

A:	$C_{p,net}$=	-1.3		neto pritisci vetra	w_e=	-0.566 kN/m²
B:	$C_{p,net}$=	-2	b/10=3m	$w_e = q_{p(z)} * C_{p,e} \rightarrow$	w_e=	-0.871 kN/m²
C:	$C_{p,net}$=	-1.8	d/10=2m		w_e=	-0.784 kN/m²
D:	$C_{p,net}$=	-1.8			w_e=	-0.784 kN/m²

5. Seizmika - (prema SRPS EN 1998-1) i odgovarajući NA
Uzeto u obzir direktno kroz program sa sledećim ulaznim podacima:

- Lokacija:		B. Topola
- Referentno maksimalno ubrzanje tla tipa A:	a_{gR}=	0.05g
- Faktor značaja:	$\gamma_1 = \gamma_a$ =	1
- Projektno ubrzanje tla:	$a_g = \gamma_1 * a_{gR}$ = 1*0.05g =	0.05g
- Kategorija tla:		D
- Tip elastičnog odgovora:		1
- Faktor ponašanja:	q_a=	1.5
- Faktor tla (iz tabele 3.2):	S=	1.35

1. Izometrija



2. Ulazni podaci - konstrukcija

2.1. Materijali

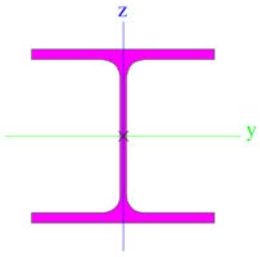
Čelik EC3

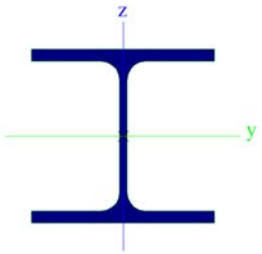
Naziv	ρ [kg/m³]	E_{mod} [MPa]	μ	Lower limit [cm]	Upper limit [cm]	F_y [MPa]	F_u [MPa]	Boja
		G_{mod} [MPa]	α [m/m°C]					
S 235	7850.000	2.100e+05	0.3	0.00	4.00	235.000	360.000	
		8.077e+04	0.00	4.00	8.00	215.000	360.000	
S 275	7850.000	2.100e+05	0.3	0.00	4.00	275.000	430.000	
		8.077e+04	0.00	4.00	8.00	255.000	410.000	

Naziv	Vrsta	ρ [kg/m³]	Gustoća u svježem stanju [kg/m³]	E_{mod} [MPa]	μ	α [m/m°C]	$f_{c.k.28}$ [MPa]	Boja
C25/30	Beton	2500.000	2600.000	3.150e+04	0.2	0.00	25.00	

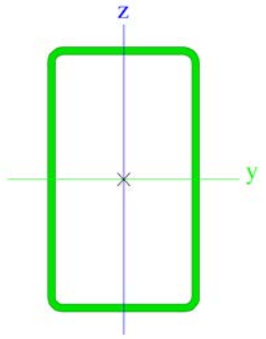
Objašnjenja simbola	
Gustoća u svježem stanju	Vrijednost svojstva gustoće u svježem stanju koristi se samo za spregnute ploeč i računa svoju vlastitu težinu kao opterećenje.

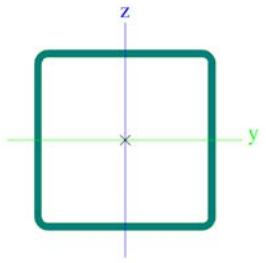
2.2. Poprečni-presjeci

HEA 160		
Vrsta	HEA160	
Formcode	1 - I presjek	
Vrsta oblika	Tankostjeni	
materijal predmeta	S 235	
Proizvodnja	uvaljani	
Boja		
Čvrstoća izvijanje y-y, Čvrstoća izvijanje z-z	b	c
A [cm²]	38.800	
A_y [cm²], A_z [cm²]	28.071	9.839
A_L [m²/m], A_D [m²/m]	9.06e-01	9.06e-01
$c_{Y.UCS}$ [cm], $c_{Z.UCS}$ [cm]	8.00	7.60
α [deg]	0.00	
I_y [cm⁴], I_z [cm⁴]	1670.000	616.000
i_y [cm], i_z [cm]	6.56	3.98
$W_{el.y}$ [cm³], $W_{el.z}$ [cm³]	220.000	77.000
$W_{pl.y}$ [cm³], $W_{pl.z}$ [cm³]	245.000	117.500
$M_{pl.y.+}$ [kNcm], $M_{pl.y.-}$ [kNcm]	5.77e+03	5.77e+03
$M_{pl.z.+}$ [kNcm], $M_{pl.z.-}$ [kNcm]	2.77e+03	2.77e+03
d_y [cm], d_z [cm]	0.00	0.00
I_t [cm⁴], I_w [cm⁶]	12.200	31409.664
β_y [cm], β_z [cm]	0.00	0.00
Slika		

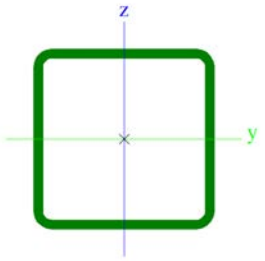
HEA 120		
Vrsta	HEA120	
Formcode	1 - I presjek	
Vrsta oblika	Tankostjeni	
materijal predmeta	S 275	
Proizvodnja	uvaljani	
Boja		
Čvrstoća izvijanje y-y, Čvrstoća izvijanje z-z	b	c
A [cm²]	25.300	
A_y [cm²], A_z [cm²]	18.775	6.170
A_L [m²/m], A_D [m²/m]	6.77e-01	6.77e-01
$c_{Y.UCS}$ [cm], $c_{Z.UCS}$ [cm]	6.00	5.70
α [deg]	0.00	
I_y [cm⁴], I_z [cm⁴]	606.000	231.000
i_y [cm], i_z [cm]	4.89	3.02
$W_{el.y}$ [cm³], $W_{el.z}$ [cm³]	106.000	38.500
$W_{pl.y}$ [cm³], $W_{pl.z}$ [cm³]	119.583	58.750
$M_{pl.y.+}$ [kNcm], $M_{pl.y.-}$ [kNcm]	3.29e+03	3.29e+03
$M_{pl.z.+}$ [kNcm], $M_{pl.z.-}$ [kNcm]	1.62e+03	1.62e+03
d_y [cm], d_z [cm]	0.00	0.00
I_t [cm⁴], I_w [cm⁶]	5.990	6471.936
β_y [cm], β_z [cm]	0.00	0.00
Slika		

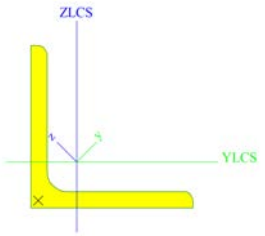
140x80x4		
Vrsta	CFRHS140X80X4	
Formcode	2 - Pravokutni šuplji profil	
Vrsta oblika	Tankostjeni	
materijal predmeta	S 235	
Proizvodnja	hladno oblikovani	
Boja		
Čvrstoća izvijanje y-y, Čvrstoća izvijanje z-z	c	c
A [cm²]	16.550	
A_y [cm²], A_z [cm²]	6.015	10.526
A_L [m²/m], A_D [m²/m]	4.26e-01	8.27e-01
$c_{Y.UCS}$ [cm], $c_{Z.UCS}$ [cm]	4.00	7.00
α [deg]	0.00	
I_y [cm⁴], I_z [cm⁴]	429.600	180.420
i_y [cm], i_z [cm]	5.09	3.30
$W_{el.y}$ [cm³], $W_{el.z}$ [cm³]	61.370	45.100
$W_{pl.y}$ [cm³], $W_{pl.z}$ [cm³]	75.510	51.310
$M_{pl.y.+}$ [kNcm], $M_{pl.y.-}$ [kNcm]	1.77e+03	1.77e+03
$M_{pl.z.+}$ [kNcm], $M_{pl.z.-}$ [kNcm]	1.21e+03	1.21e+03
d_y [cm], d_z [cm]	0.00	0.00
I_t [cm⁴], I_w [cm⁶]	411.600	4599.467
β_y [cm], β_z [cm]	0.00	0.00

Slika		

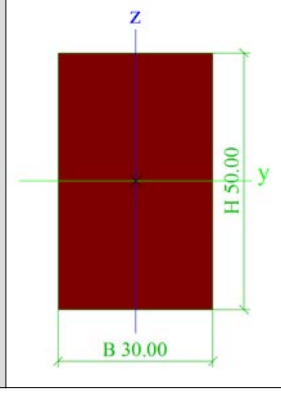
80x80x3		
Vrsta	CFRHS80X80X3	
Formcode	2 - Pravokutni šuplji profil	
Vrsta oblika	Tankostjeni	
materijal predmeta	S 235	
Proizvodnja	hladno oblikovani	
Boja		
Čvrstoća izvijanje y-y, Čvrstoća izvijanje z-z	c	c
A [cm^2]	9.010	
A_y [cm^2], A_z [cm^2]	4.502	4.502
A_L [m^2/m], A_D [m^2/m]	3.10e-01	6.00e-01
$c_{Y.UCS}$ [cm], $c_{Z.UCS}$ [cm]	4.00	4.00
α [deg]	0.00	
I_y [cm^4], I_z [cm^4]	87.840	87.840
i_y [cm], i_z [cm]	3.12	3.12
$W_{el.y}$ [cm^3], $W_{el.z}$ [cm^3]	21.960	21.960
$W_{pl.y}$ [cm^3], $W_{pl.z}$ [cm^3]	25.780	25.780
$M_{pl.y.+}$ [kNcm], $M_{pl.y.-}$ [kNcm]	6.05e+02	6.05e+02
$M_{pl.z.+}$ [kNcm], $M_{pl.z.-}$ [kNcm]	6.05e+02	6.05e+02
d_y [cm], d_z [cm]	0.00	0.00
I_t [cm^4], I_w [cm^6]	139.930	819.200
β_y [cm], β_z [cm]	0.00	0.00
Slika		

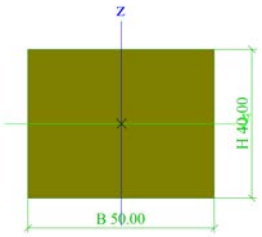
60x60x3		
Vrsta	CFRHS60X60X3	
Formcode	2 - Pravokutni šuplji profil	
Vrsta oblika	Tankostjeni	
materijal predmeta	S 235	
Proizvodnja	hladno oblikovani	
Boja		
Čvrstoća izvijanje y-y, Čvrstoća izvijanje z-z	c	c
A [cm^2]	6.610	
A_y [cm^2], A_z [cm^2]	3.302	3.302
A_L [m^2/m], A_D [m^2/m]	2.30e-01	4.40e-01
$c_{Y.UCS}$ [cm], $c_{Z.UCS}$ [cm]	3.00	3.00
α [deg]	0.00	
I_y [cm^4], I_z [cm^4]	35.130	35.130
i_y [cm], i_z [cm]	2.31	2.31
$W_{el.y}$ [cm^3], $W_{el.z}$ [cm^3]	11.710	11.710
$W_{pl.y}$ [cm^3], $W_{pl.z}$ [cm^3]	13.950	13.950
$M_{pl.y.+}$ [kNcm], $M_{pl.y.-}$ [kNcm]	3.28e+02	3.28e+02
$M_{pl.z.+}$ [kNcm], $M_{pl.z.-}$ [kNcm]	3.28e+02	3.28e+02
d_y [cm], d_z [cm]	0.00	0.00
I_t [cm^4], I_w [cm^6]	57.090	194.400
β_y [cm], β_z [cm]	0.00	0.00

Slika		

L100x10		
Vrsta	L100X10	
Formcode	4 - odjeljak L	
Vrsta oblika	Tankostjeni	
materijal predmeta	S 235	
Proizvodnja	uvaljani	
Boja		
Čvrstoća izvijanje y-y, Čvrstoća izvijanje z-z	b	b
A [cm^2]	19.200	
A_y [cm^2], A_z [cm^2]	16.118	16.187
A_L [m^2/m], A_D [m^2/m]	3.90e-01	3.90e-01
$c_{Y.UCS}$ [cm], $c_{Z.UCS}$ [cm]	2.82	2.82
$I_{Y.LCS}$ [cm^4], $I_{Z.LCS}$ [cm^4]	177.000	177.000
$I_{YZ.LCS}$ [cm^4]	-103.620	
α [deg]	45.00	
I_y [cm^4], I_z [cm^4]	280.000	73.300
i_y [cm], i_z [cm]	3.82	1.95
$W_{el.y}$ [cm^3], $W_{el.z}$ [cm^3]	39.631	18.292
$W_{pl.y}$ [cm^3], $W_{pl.z}$ [cm^3]	62.946	32.343
$M_{pl.y.+}$ [kNcm], $M_{pl.y.-}$ [kNcm]	1.48e+03	1.48e+03
$M_{pl.z.+}$ [kNcm], $M_{pl.z.-}$ [kNcm]	7.60e+02	7.60e+02
d_y [cm], d_z [cm]	-3.36	0.00
I_t [cm^4], I_w [cm^6]	6.670	0.000
β_y [cm], β_z [cm]	0.00	13.20
Slika		

50x30		
Vrsta	Rectangle	
Detaljno	50.00; 30.00	
Vrsta oblika	Masivni	
materijal predmeta	C25/30	
Proizvodnja	beton	
Boja		
A [cm^2]	1500.000	
A_y [cm^2], A_z [cm^2]	1252.415	1250.869
A_L [m^2/m], A_D [m^2/m]	1.60e+00	1.60e+00
$c_{Y.UCS}$ [cm], $c_{Z.UCS}$ [cm]	15.00	25.00
α [deg]	0.00	
I_y [cm^4], I_z [cm^4]	312500.000	112500.000
i_y [cm], i_z [cm]	14.43	8.66
$W_{el.y}$ [cm^3], $W_{el.z}$ [cm^3]	12500.000	7500.000
$W_{pl.y}$ [cm^3], $W_{pl.z}$ [cm^3]	0.000	0.000
$M_{pl.y.+}$ [kNcm], $M_{pl.y.-}$ [kNcm]	0.00e+00	0.00e+00
$M_{pl.z.+}$ [kNcm], $M_{pl.z.-}$ [kNcm]	0.00e+00	0.00e+00
d_y [cm], d_z [cm]	0.00	0.00
I_t [cm^4], I_w [cm^6]	281156.012	5374820.057
β_y [cm], β_z [cm]	0.00	0.00

Slika		

40x50		
Vrsta	Rectangle	
Detaljno	40.00; 50.00	
Vrsta oblika	Masivni	
materijal predmeta	C25/30	
Proizvodnja	beton	
Boja		
A [cm^2]	2000.000	
A_y [cm^2], A_z [cm^2]	1668.335	1669.274
A_L [m^2/m], A_D [m^2/m]	1.80e+00	1.80e+00
$c_{Y.UCS}$ [cm], $c_{Z.UCS}$ [cm]	25.00	20.00
α [deg]	0.00	
I_y [cm^4], I_z [cm^4]	266666.667	416666.667
i_y [cm], i_z [cm]	11.55	14.43
$W_{el.y}$ [cm^3], $W_{el.z}$ [cm^3]	13333.333	16666.667
$W_{pl.y}$ [cm^3], $W_{pl.z}$ [cm^3]	0.000	0.000
$M_{pl.y.+}$ [kNcm], $M_{pl.y.-}$ [kNcm]	0.00e+00	0.00e+00
$M_{pl.z.+}$ [kNcm], $M_{pl.z.-}$ [kNcm]	0.00e+00	0.00e+00
d_y [cm], d_z [cm]	0.00	0.00
I_t [cm^4], I_w [cm^6]	548637.012	3559624.064
β_y [cm], β_z [cm]	0.00	0.00
Slika		

Objašnjenja simbola	
Formcode	h - Height b - Flange širina t - Flange debljina s - Web debljina r - Radius na prirubnici korijena R1 - Radius na prirubnici pete a - Flange nagib W - Internal vijak udaljenost wm - Unit savijanje na prirubnici nožni prst
A	Površina
A_y	Površina posmika u glavnom y-smjeru
A_z	Površina posmika u glavnom z-smjeru
A_L	Opseg po jedinici duljine
A_D	Površina Sušenje po jedinici duljine
$c_{Y.UCS}$	Težište koordinirata u Y-smjeru unosa
$c_{Z.UCS}$	Težište koordinirata u Z-smjeru unosa
$I_{Y.LCS}$	Drugi moment površine oko YLKS osi
$I_{Z.LCS}$	Drugi moment površine oko ZLKS osi
$I_{YZ.LCS}$	Trenutak Proizvod prostora u LCS sustav
α	Kut zakretanja glavne osi sustava
I_y	Drugi moment površine oko glavne y-osi
I_z	Drugi moment površine oko glavne z-osi
i_y	Radijus giracije o glavnoj osi y

Objašnjenja simbola	
i_z	Radijus giracije o glavnoj osi z
$W_{el.y}$	Modula elastičnosti sekcije o glavnoj osi y
$W_{el.z}$	Modula elastičnosti sekcije o glavnoj osi z
$W_{pl.y}$	Plastika Moment otpora o glavnoj osi y
$W_{pl.z}$	Plastika Moment otpora o glavnoj osi z
$M_{pl.y.+}$	Plastični trenutak o glavnoj osi y za pozitivan moj trenutak
$M_{pl.y.-}$	Plastični trenutak o glavnoj osi y za negativnu moj trenutak
$M_{pl.z.+}$	Plastični trenutak o glavnom z-osi za pozitivan MZ trenutku
$M_{pl.z.-}$	Plastični trenutak o glavnom z-osi za negativnu MZ trenutku
d_y	Koordinata središta posmika u glavnom y-smjeru mjereno iz težišta
d_z	Koordinata središta posmika u glavnom z-smjeru mjereno iz težišta
I_t	Konstanta torzije
I_w	Konstanta vitoperenja
β_y	Mono-simetrija stalna o glavnoj osi y
β_z	Mono-simetrija stalna o glavnoj osi z

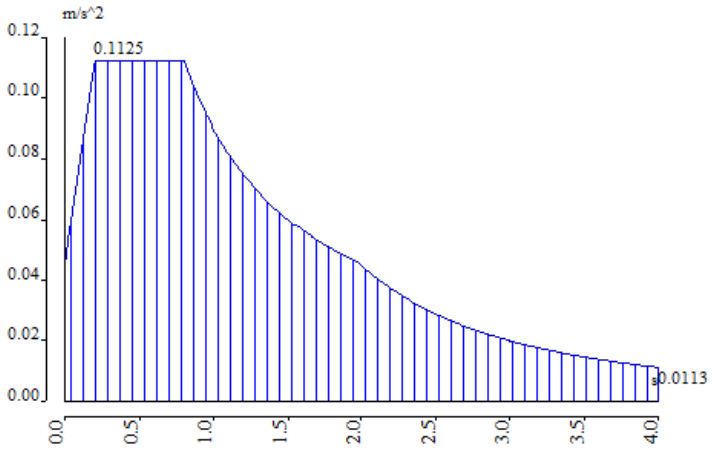
2.3. Slojevi

Naziv	Samo model konstrukcije	Boja
01 - Stubovi	✗	
02 - Donji pojas	✗	
03 - Gornji pojas	✗	
04 - Vertikale	✗	
05 - Dijagonale	✗	
06 - Rožnjače	✗	
07 - Krovni spreg	✗	
08 - Vertikalni spreg	✗	
09 - Kosnik	✗	
10 - Vrat temelja	✗	
11 - Temeljne grede	✗	
12 - Stopa temelja	✗	
Load panel za stalno	✗	
Load panel za vetar	✗	
Pomoćne linije	✗	

2.4. Tlo

Naziv	C1x [kN/m³]	C1z	C1y [kN/m³]	Krutost [kN/m³]	C2x [kN/m]	C2y [kN/m]
Glinovita prašina	2000.0000	Savitljiv	2000.0000	20000.0000	0.0000	0.0000

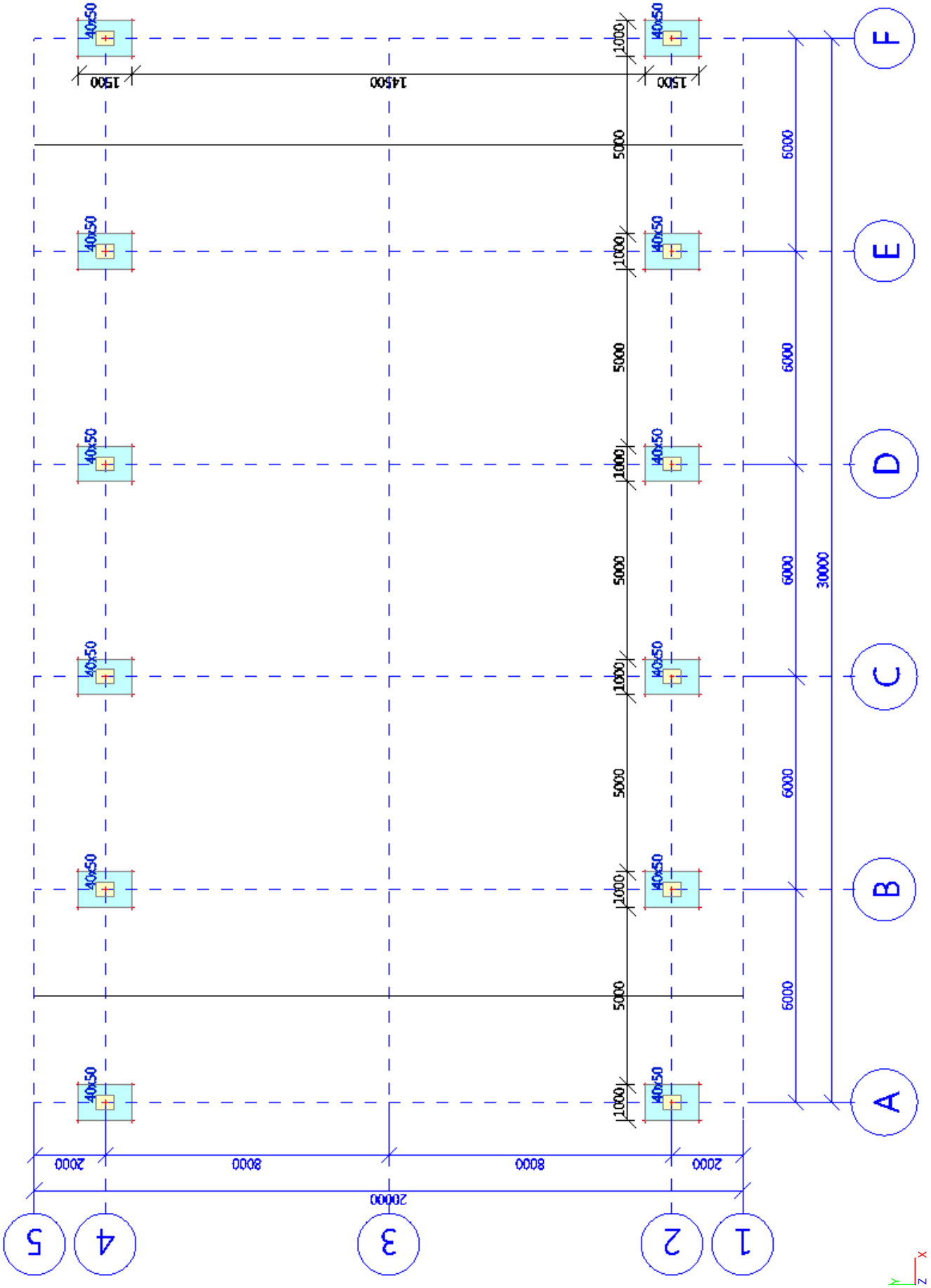
2.5. Seizmički spektri

Naziv	Vrsta crteža	Informacije	Crtež
JedinstveniID			
FS1	Razdoblje	Vrsta norme - Eurokod Podtlo vrsta - D Smjer - Horizontalno Vrsta spektra - vrsta 1 Koef ubrzanja. ag - 0.00509684 ag - proračunsko ubrzanje tla - 0.05 beta - 0.2 q - faktor ponašanja - 1.5	

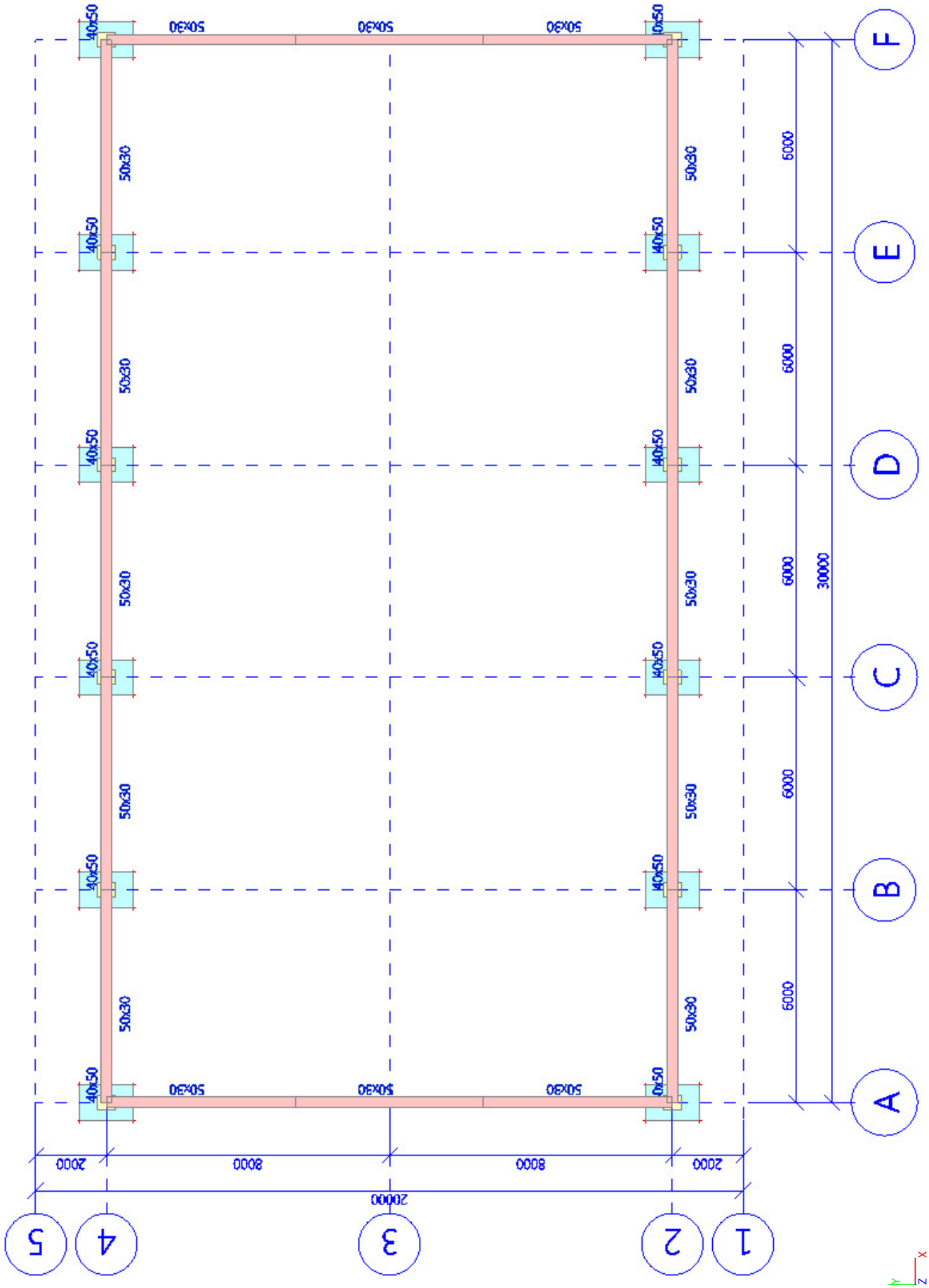
2.6. oslonci 2D elemenata

Naziv	Vrsta	temeljno tlo	2D element
SS1	Pojedinačno	Glinovita prašina - Tlo	S1
SS2	Pojedinačno	Glinovita prašina - Tlo	S2
SS3	Pojedinačno	Glinovita prašina - Tlo	S3
SS4	Pojedinačno	Glinovita prašina - Tlo	S4
SS5	Pojedinačno	Glinovita prašina - Tlo	S5
SS6	Pojedinačno	Glinovita prašina - Tlo	S6
SS7	Pojedinačno	Glinovita prašina - Tlo	S7
SS8	Pojedinačno	Glinovita prašina - Tlo	S8
SS9	Pojedinačno	Glinovita prašina - Tlo	S9
SS10	Pojedinačno	Glinovita prašina - Tlo	S10
SS11	Pojedinačno	Glinovita prašina - Tlo	S11
SS12	Pojedinačno	Glinovita prašina - Tlo	S12

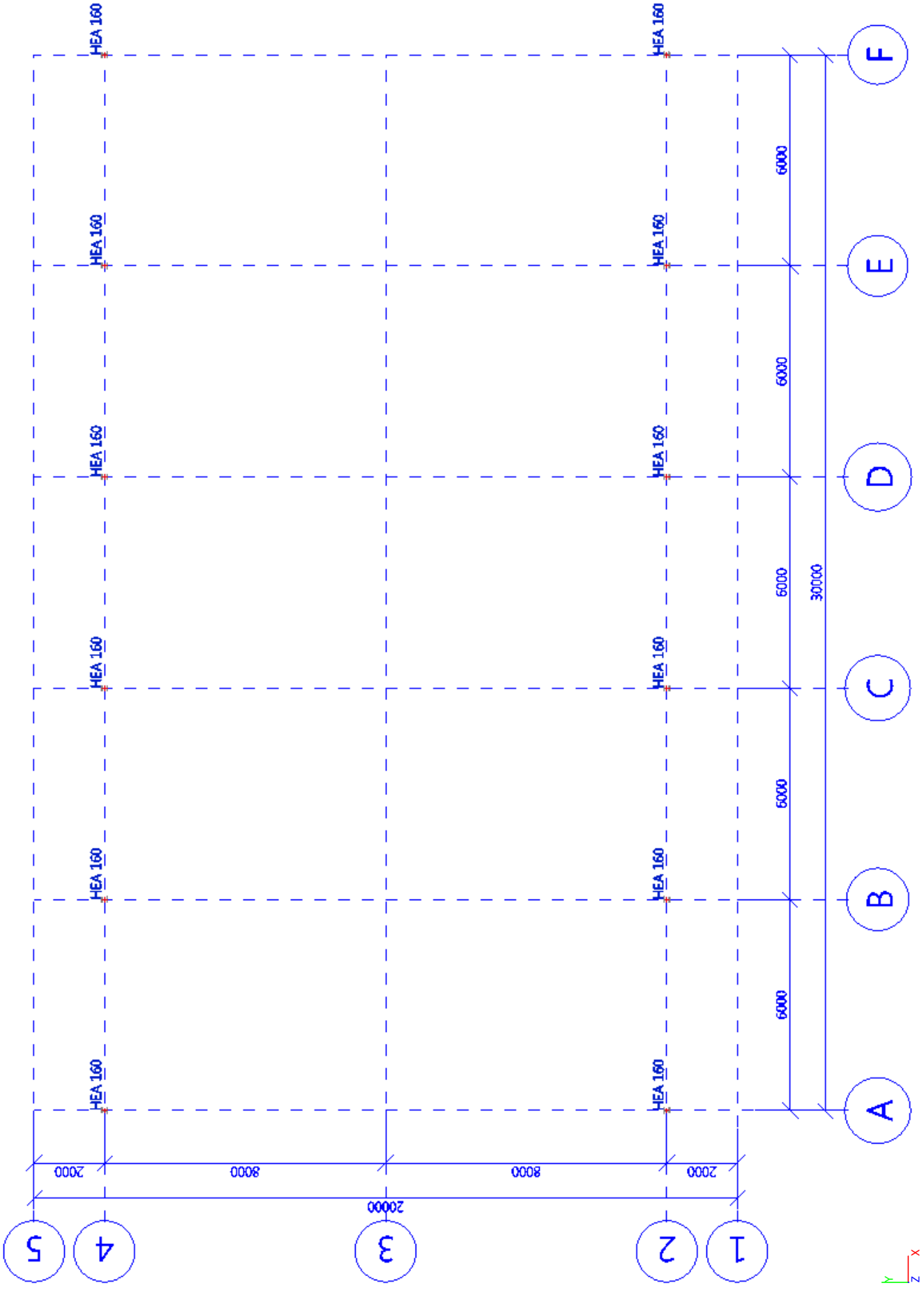
2.7. Stope temelja



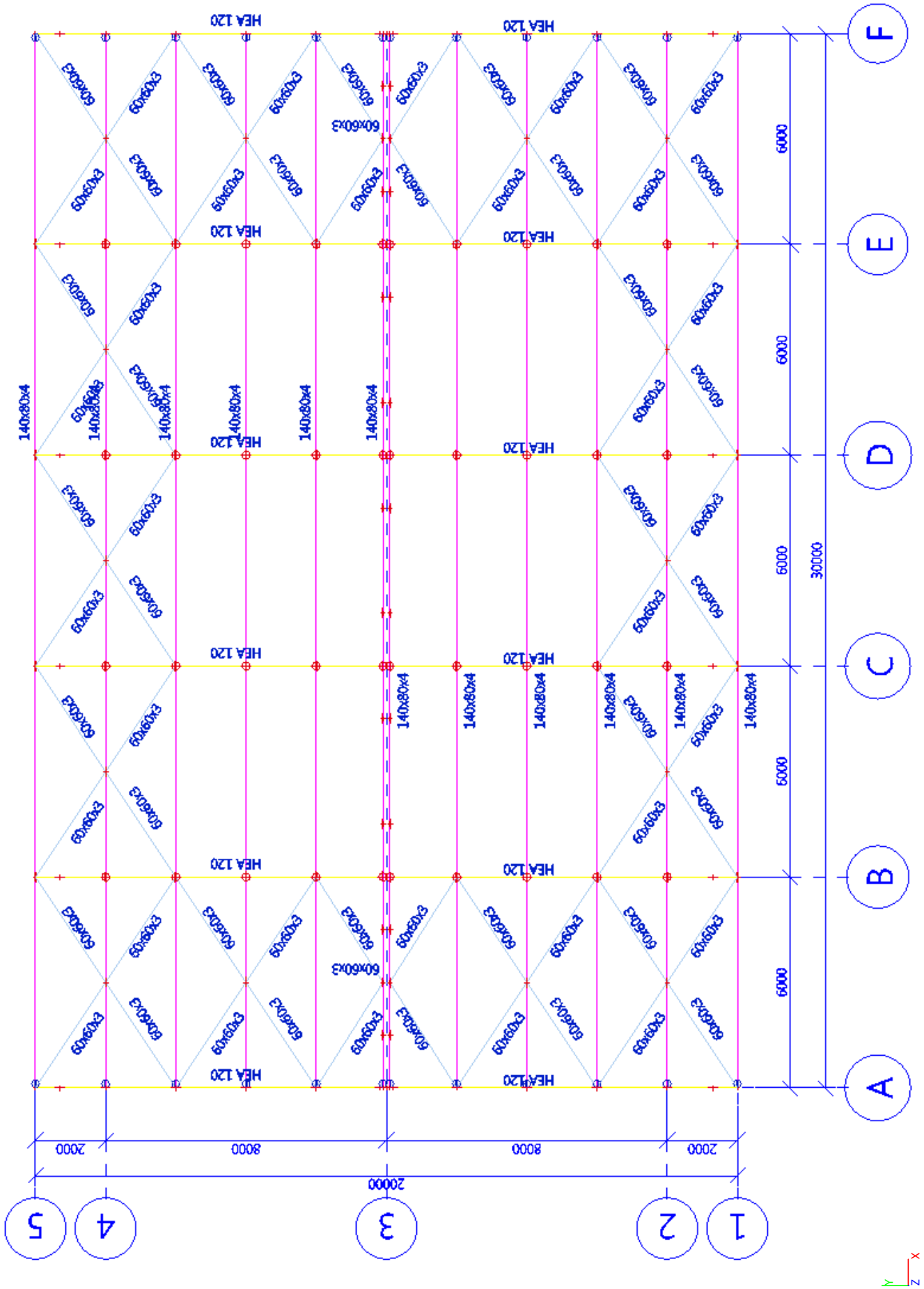
2.8. Temeljne grede



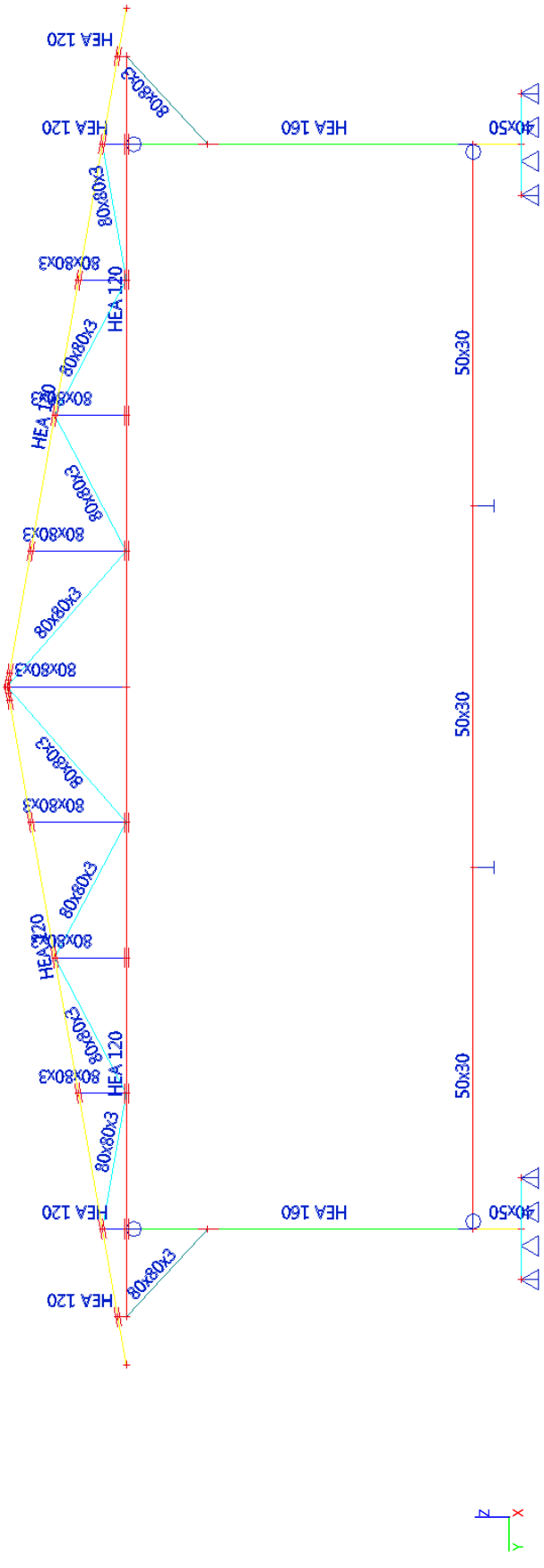
2.9. Osnova stubova



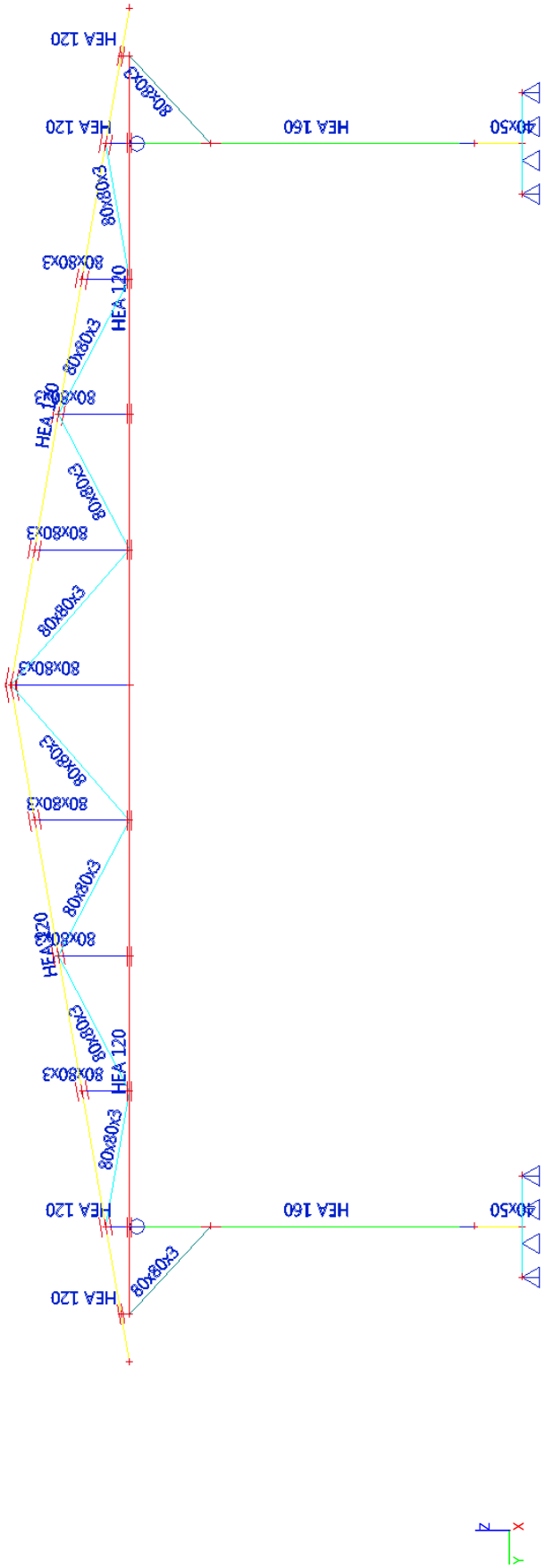
2.10. Osnova krova



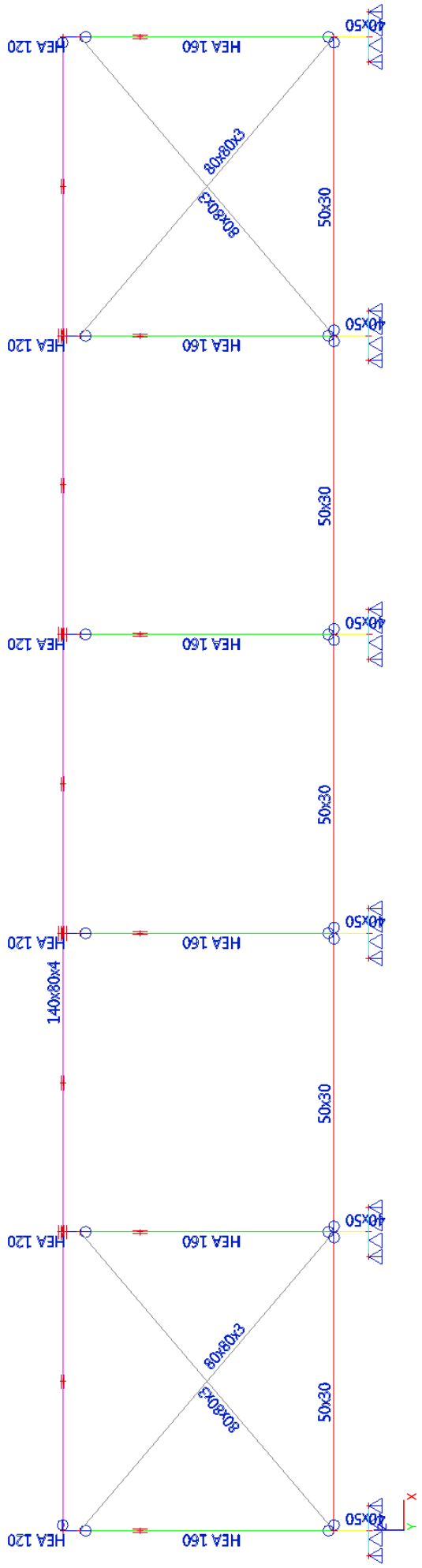
2.11. Konstrukcija u osama_A i F



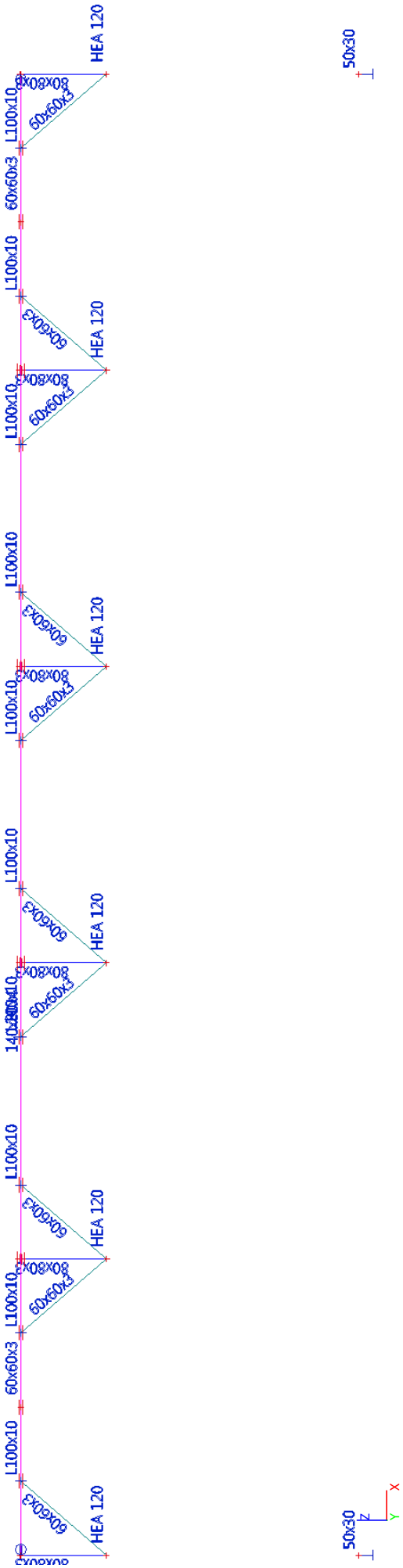
2.12. Konstrukcija u osama_B, C, D i E



2.13. Konstrukcija u osama_2 i 4



2.14. Konstrukcija u osi_3



3. Ulazni podaci - opterećenje

3.1. Slučajevi opterećenja

Naziv	Opis	Vrsta aktivnosti	Grupa opterećenja	Smjer	Trajanje	Glavni slučaj opterećenja
	Spec	Vrsta opterećenja				
G	Sopstvena težina	Trajno Vlastita težina	LG1	-Z		
G1	Stalno opterećenje	Trajno Standardno	LG1			
P	Korisno opterećenje Standardno	Varijabla Stat.	LG2		Dugačko	Ne postoji
S	Sneg simetrično Snijeg	Varijabla Stat.	LG3			Ne postoji
SL	Sneg antimetrično levo Snijeg	Varijabla Stat.	LG3			Ne postoji
SD	Sneg antimetrično desno Snijeg	Varijabla Stat.	LG3			Ne postoji
W	Vetar Statički vjetar	Varijabla Stat.	LG4			Ne postoji
WK	Vetar na kalkan Statički vjetar	Varijabla Stat.	LG4			Ne postoji
WmaxL	Vetar samo leva strana Statički vjetar	Varijabla Stat.	LG4			Ne postoji
WmaxD	Vetar samo desna strana Statički vjetar	Varijabla Stat.	LG4			Ne postoji
Sx	Seizmika_X Seizmičnost	Varijabla Dinamičko	LG5			Ne postoji
Sy	Seizmika_Y Seizmičnost	Varijabla Dinamičko	LG5			Ne postoji
Sx_AE	Accidental eccentricity for Sx Seizmički izvanredni ekscentricitet	Varijabla Stat.	Sx_AE		Kratko	Sx - Seizmika_X
Sy_AE	Accidental eccentricity for Sy Seizmički izvanredni ekscentricitet	Varijabla Stat.	Sy_AE		Kratko	Sy - Seizmika_Y

3.2. Kombinacije

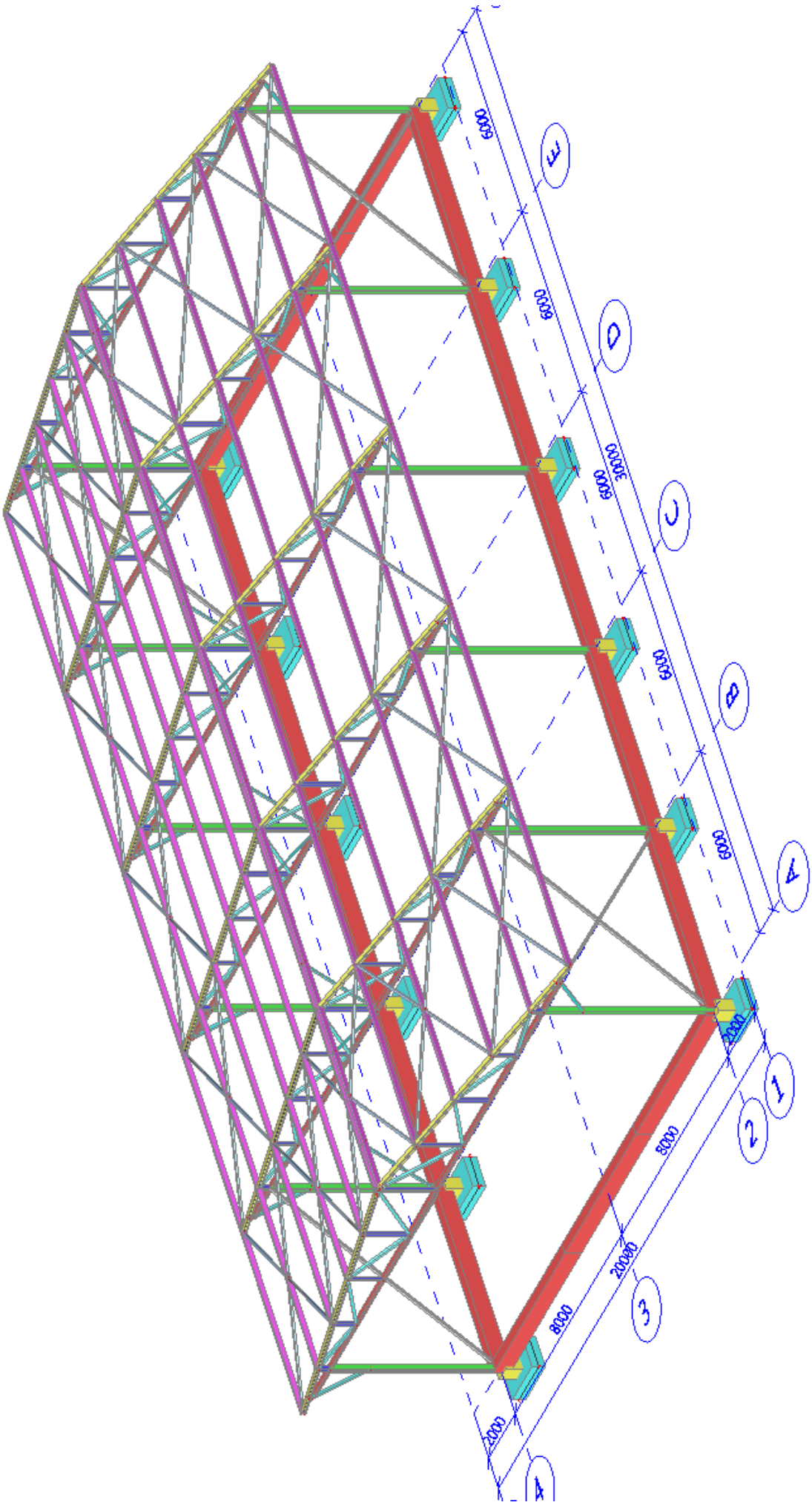
Naziv	Opis	Vrsta	Slučajevi opterećenja	Koef. [-]
ULS-Set B (auto)		HR-ULS (STR / GEO) Skupina B	G - Sopstvena težina	1.00
			G1 - Stalno opterećenje	1.00
			P - Korisno opterećenje	1.00
			S - Sneg simetrično	1.00
			SL - Sneg antimetrično levo	1.00
			SD - Sneg antimetrično desno	1.00
			W - Vetar	1.00
			WK - Vetar na kalkan	1.00
			WmaxL - Vetar samo leva strana	1.00
			WmaxD - Vetar samo desna strana	1.00
SLS-Char (auto)		HR-SLS Karakterističan	G - Sopstvena težina	1.00
			G1 - Stalno opterećenje	1.00
			P - Korisno opterećenje	1.00
			S - Sneg simetrično	1.00
			SL - Sneg antimetrično levo	1.00
			SD - Sneg antimetrično desno	1.00
			W - Vetar	1.00
			WK - Vetar na kalkan	1.00
			WmaxL - Vetar samo leva strana	1.00
			WmaxD - Vetar samo desna strana	1.00
SLS-Quasi (auto)		HR-SLS Kvazi-trajna	G - Sopstvena težina	1.00
			G1 - Stalno opterećenje	1.00
			P - Korisno opterećenje	1.00
			S - Sneg simetrično	1.00

Naziv	Opis	Vrsta	Slučajevi opterećenja	Koef. [-]
			SL - Sneg antimetrično levo	1.00
			SD - Sneg antimetrično desno	1.00
			W - Vetar	1.00
			WK - Vetar na kalkan	1.00
			WmaxL - Vetar samo leva strana	1.00
			WmaxD - Vetar samo desna strana	1.00
ULS-Seis (auto)		HR-Seizmička	G - Sopstvena težina	1.00
			G1 - Stalno opterećenje	1.00
			P - Korisno opterećenje	1.00
			S - Sneg simetrično	1.00
			SL - Sneg antimetrično levo	1.00
			SD - Sneg antimetrično desno	1.00
			W - Vetar	1.00
			Sx - Seizmika_X	1.00
			Sy - Seizmika_Y	1.00
			WK - Vetar na kalkan	1.00
			WmaxL - Vetar samo leva strana	1.00
			WmaxD - Vetar samo desna strana	1.00
			Sx_AE - Accidental eccentricity for Sx	1.00
			Sy_AE - Accidental eccentricity for Sy	1.00
Sx	Seismic load case "Sx" with accidental eccentricity effects	Omotnica - krajnji	Sx - Seizmika_X	1.00
			Sx_AE - Accidental eccentricity for Sx	1.00
Sy	Seismic load case "Sy" with accidental eccentricity effects	Omotnica - krajnji	Sy - Seizmika_Y	1.00
			Sy_AE - Accidental eccentricity for Sy	1.00
ULS-Set C		HR-ULS (STR / GEO) Skupina C	G - Sopstvena težina	1.00
			G1 - Stalno opterećenje	1.00
			P - Korisno opterećenje	1.00
			S - Sneg simetrično	1.00
			SL - Sneg antimetrično levo	1.00
			SD - Sneg antimetrično desno	1.00
			W - Vetar	1.00
			WK - Vetar na kalkan	1.00
			WmaxL - Vetar samo leva strana	1.00
			WmaxD - Vetar samo desna strana	1.00

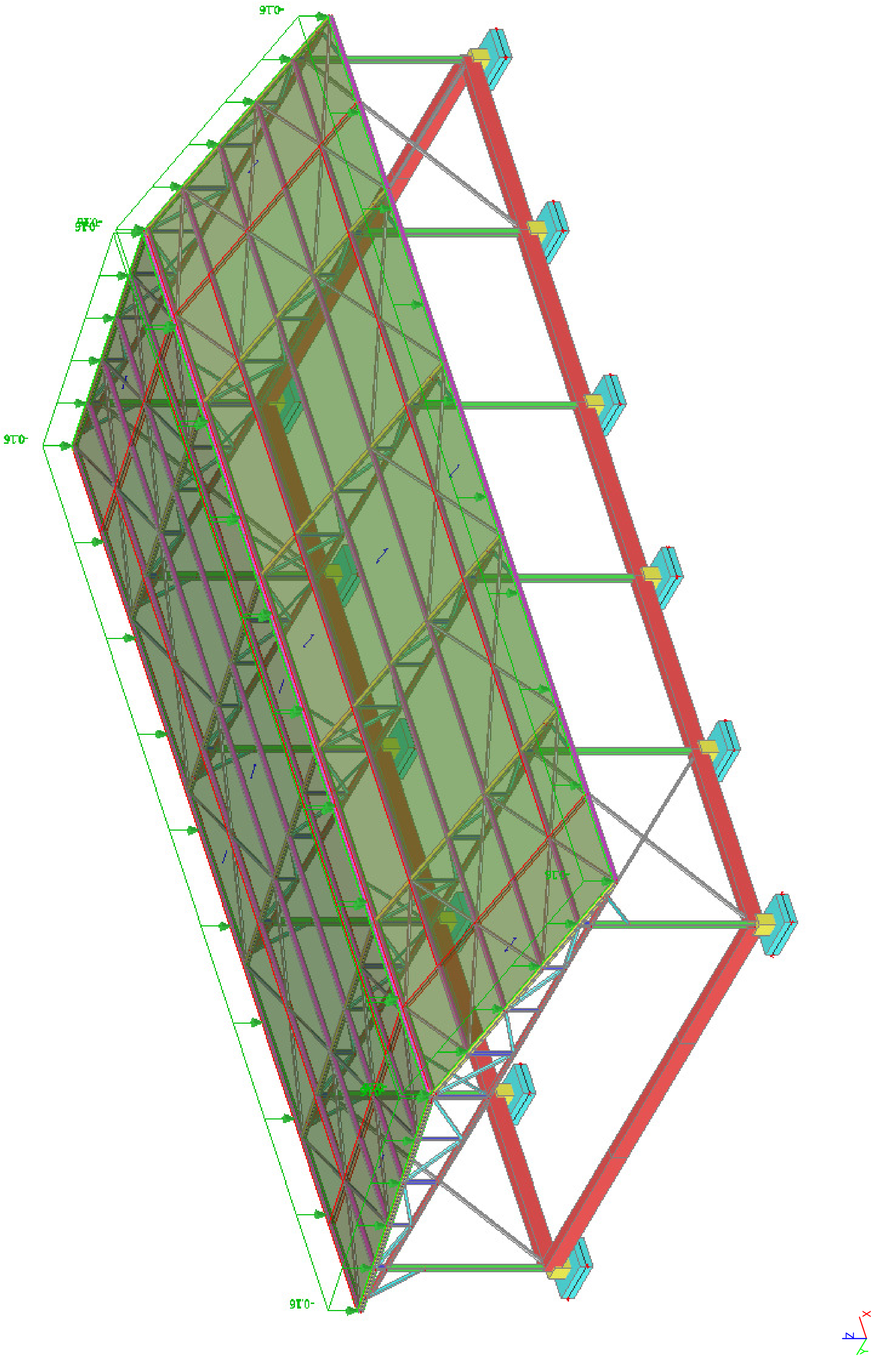
3.3. Klasa rezultata

Naziv	Popis
All ULS	ULS-Set B (auto) - HR-ULS (STR / GEO) Skupina B
	ULS-Seis (auto) - HR-Seizmička
	Sx - Omotnica - krajnji
	Sy - Omotnica - krajnji
	ULS-Set C - HR-ULS (STR / GEO) Skupina C
All SLS	SLS-Char (auto) - HR-SLS Karakterističan
	SLS-Quasi (auto) - HR-SLS Kvazi-trajna
All ULS+SLS	ULS-Set B (auto) - HR-ULS (STR / GEO) Skupina B
	ULS-Seis (auto) - HR-Seizmička
	Sx - Omotnica - krajnji
	Sy - Omotnica - krajnji
	ULS-Set C - HR-ULS (STR / GEO) Skupina C
	SLS-Char (auto) - HR-SLS Karakterističan
	SLS-Quasi (auto) - HR-SLS Kvazi-trajna
GEO	ULS-Set B (auto) - HR-ULS (STR / GEO) Skupina B
	ULS-Set C - HR-ULS (STR / GEO) Skupina C

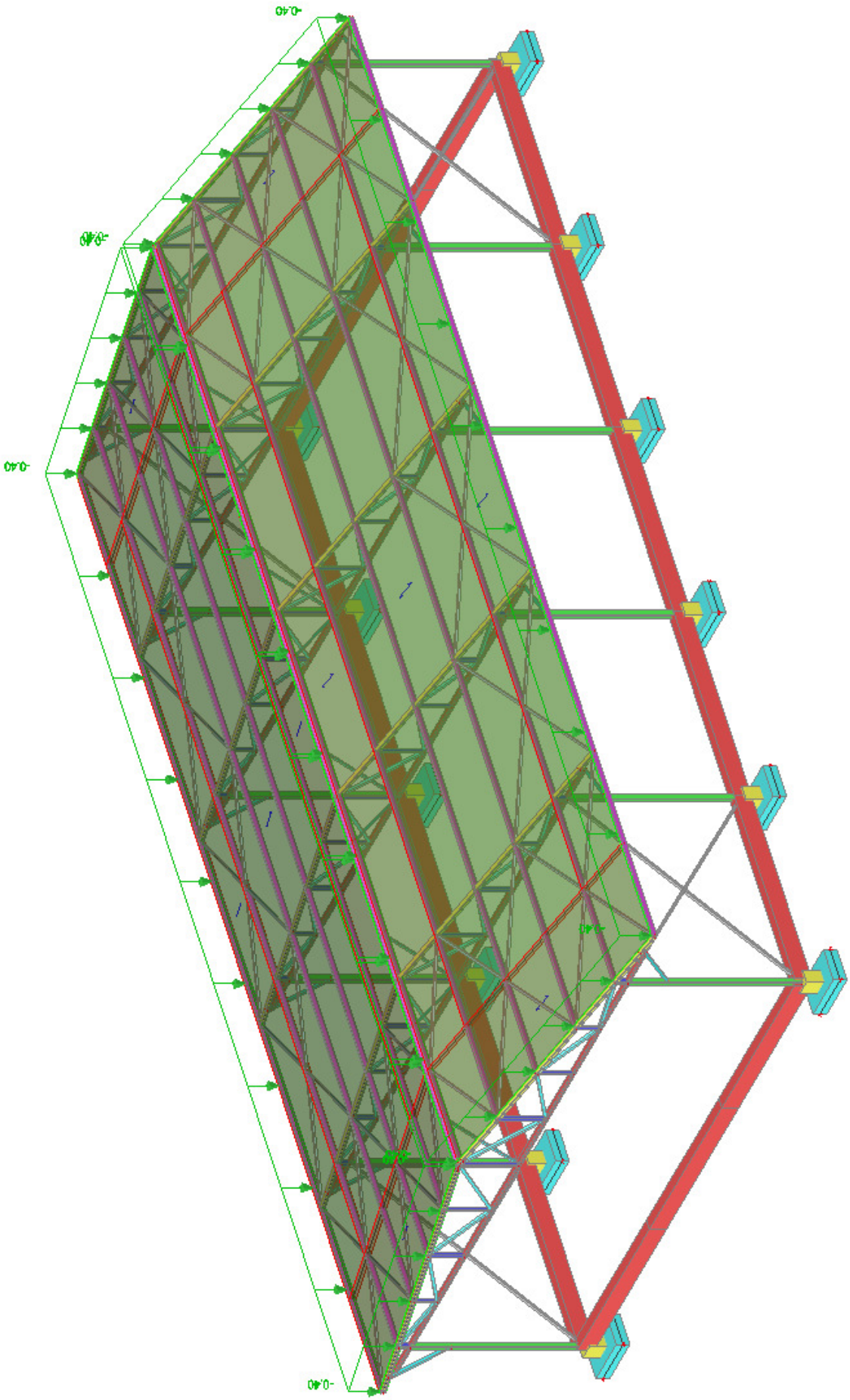
3.4. Sopstvena težina konstrukcije



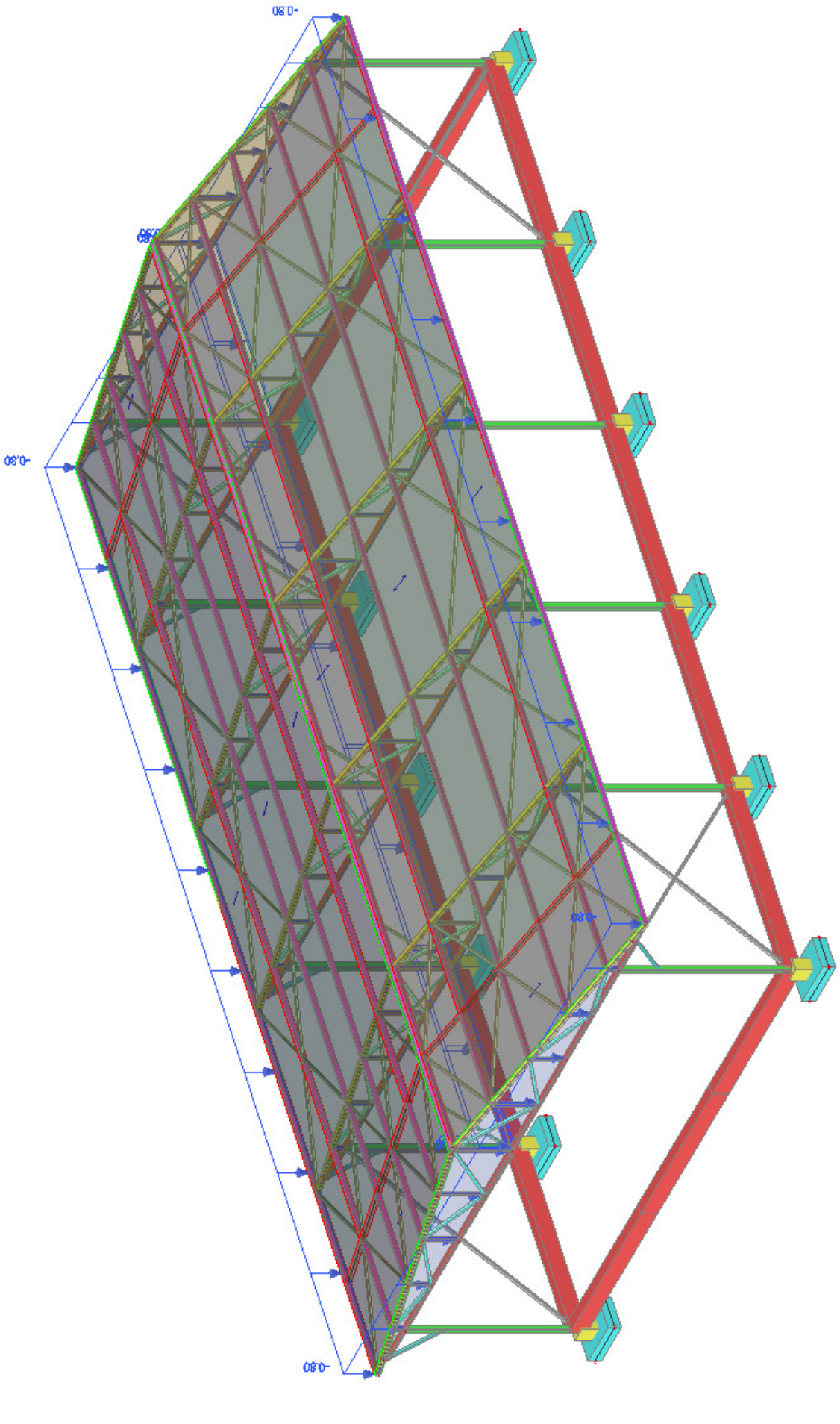
3.5. Dodatno stalno opterećenje



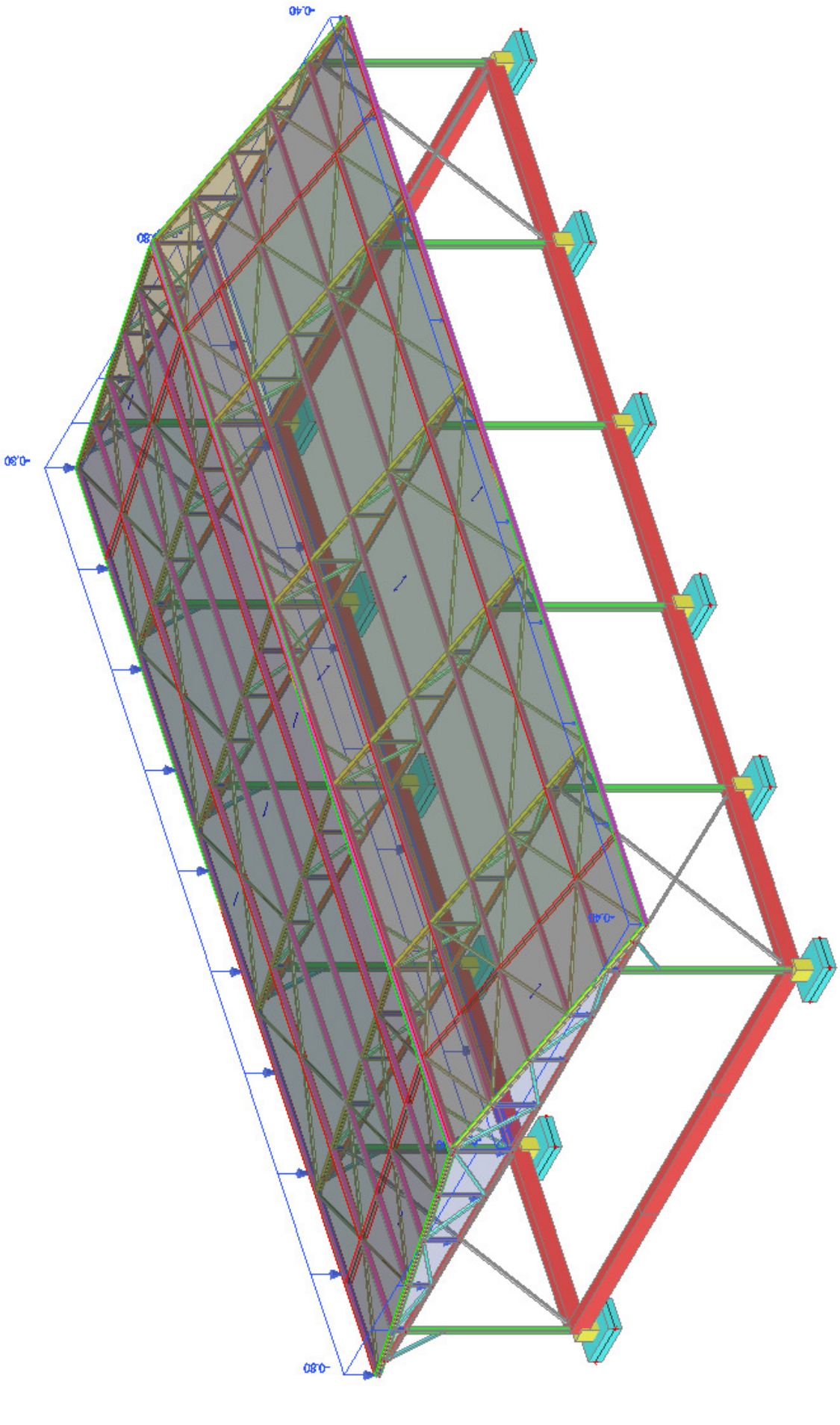
3.6. Korisno opterećenje



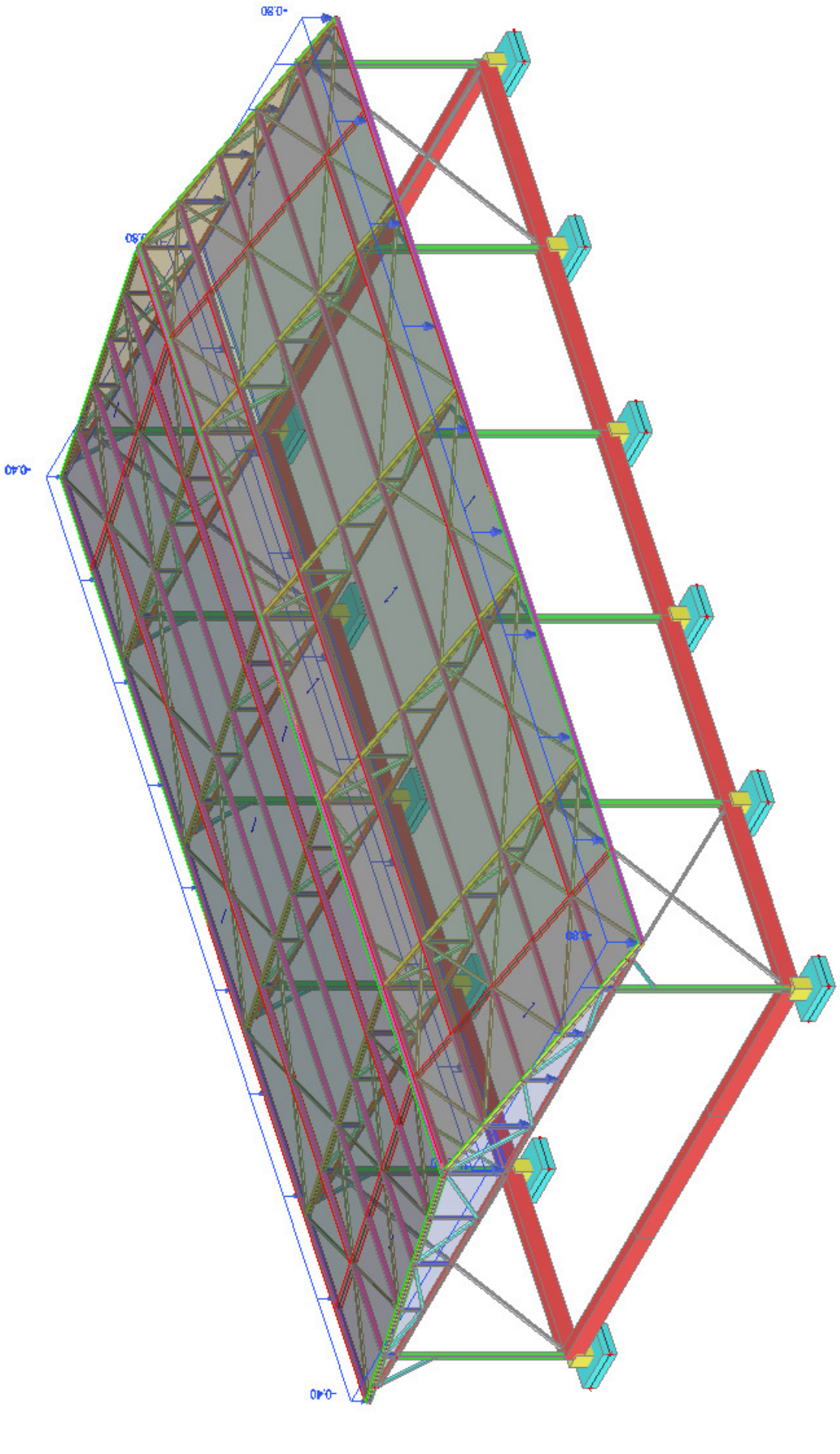
3.7. Sneg simetrično



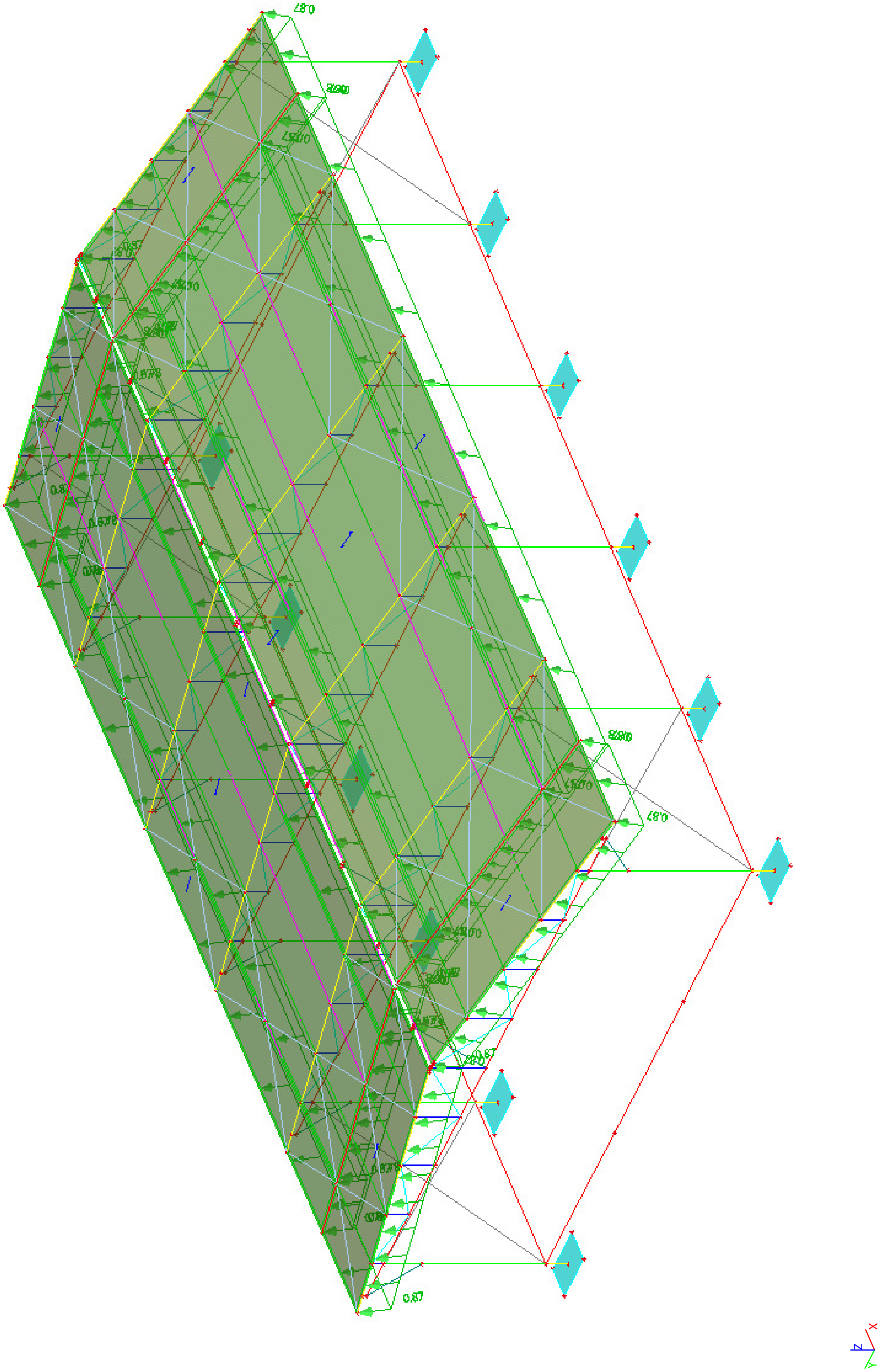
3.8. Sneg antimetrično levo



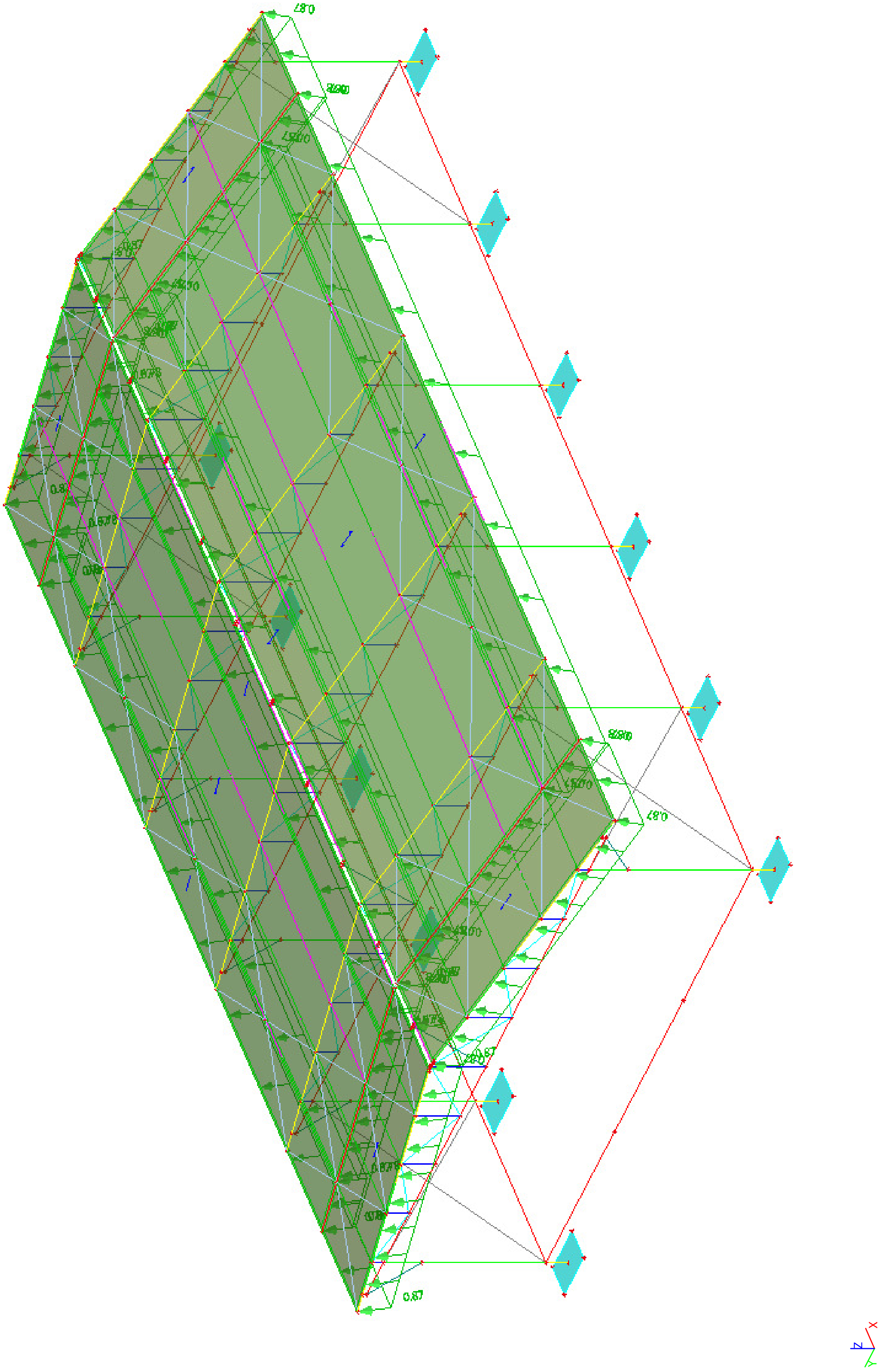
3.9. Sneg antimetrično_desno



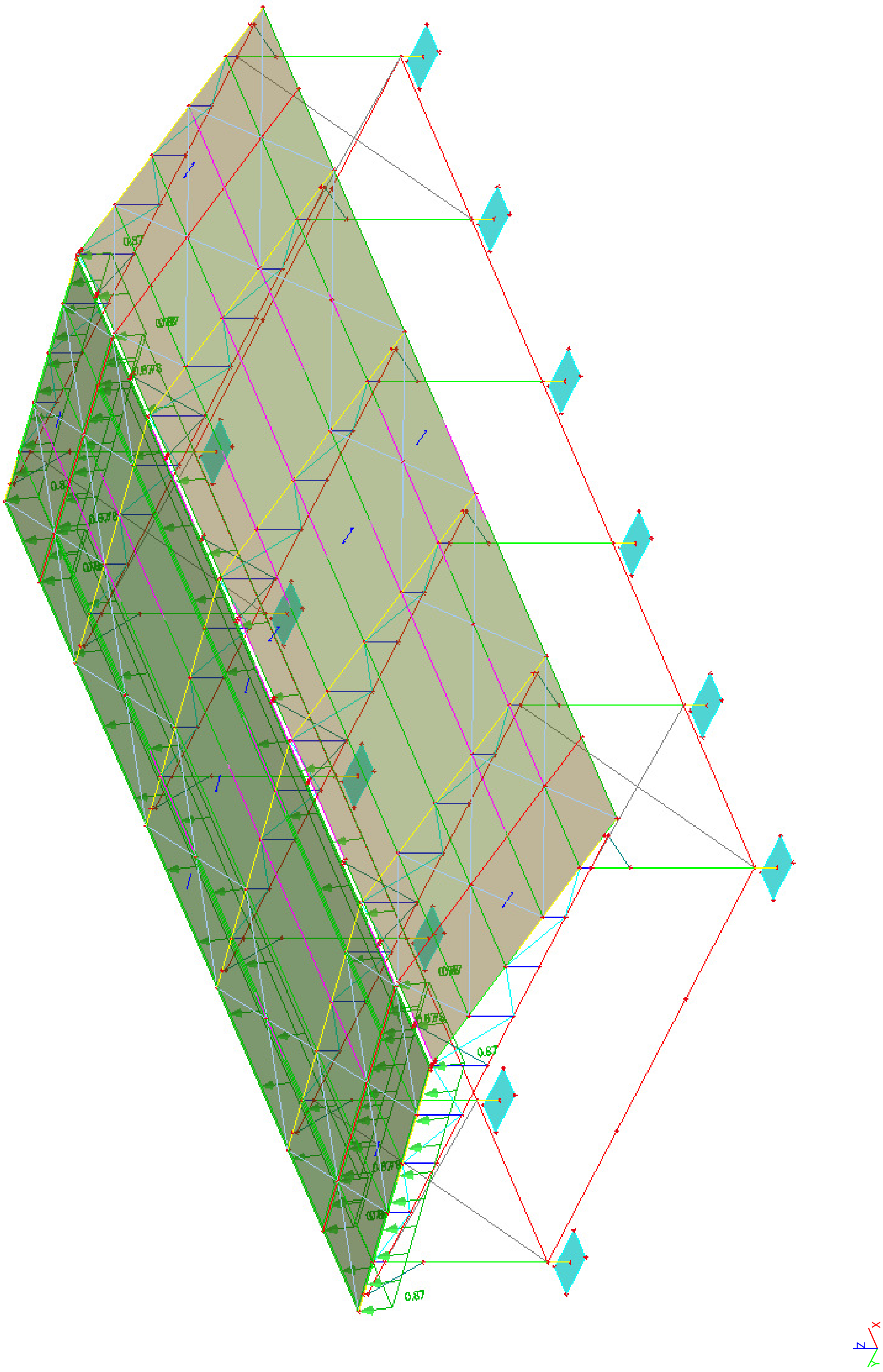
3.10. Vetar



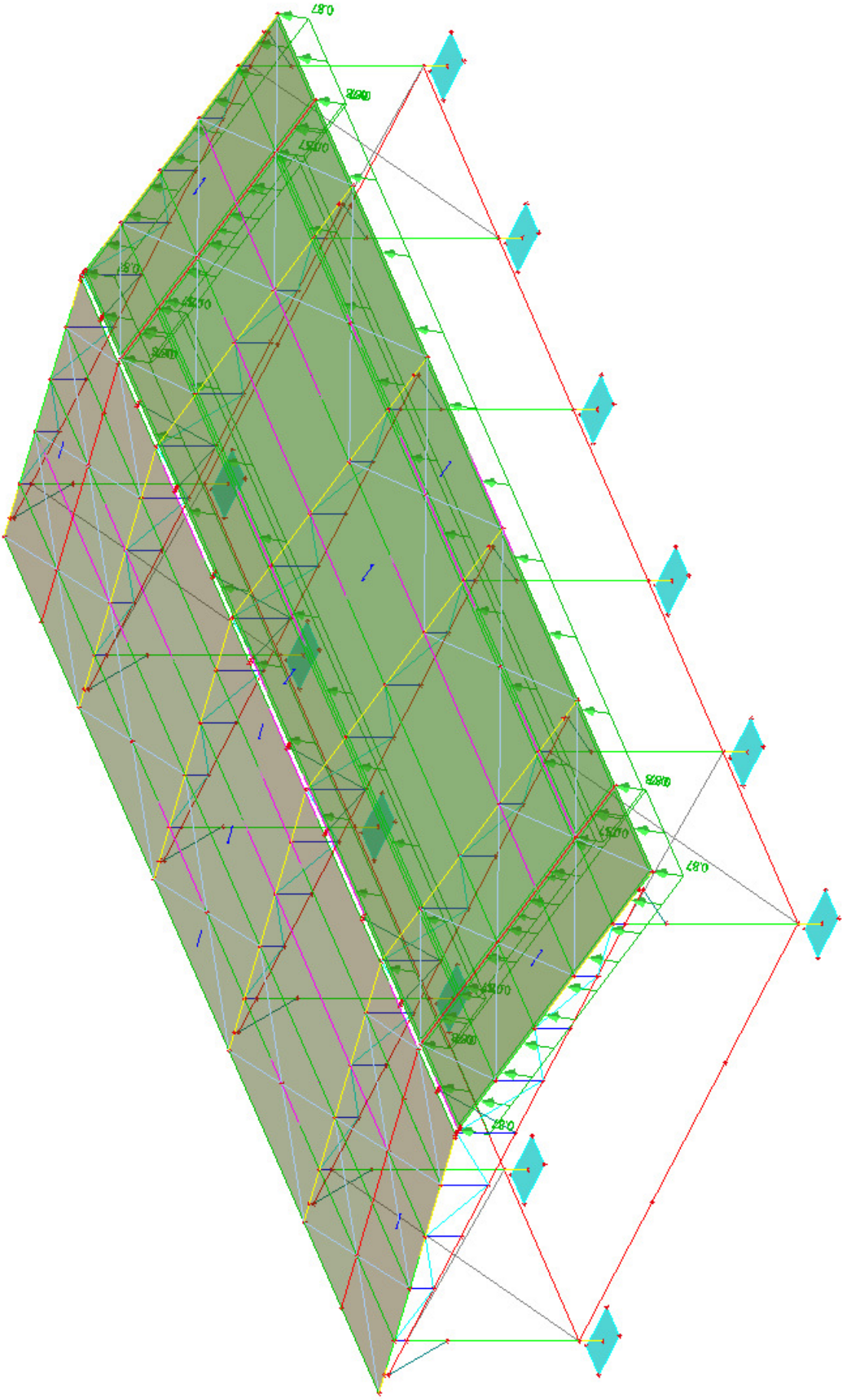
3.11. Vetar na kalkan



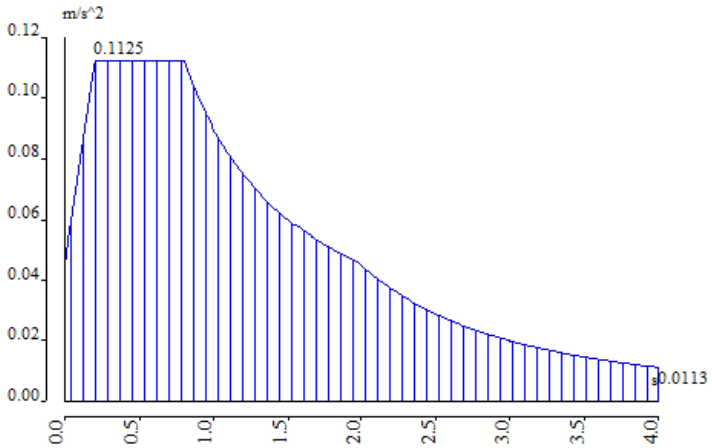
3.12. Vetar_opterećena samo leva strana



3.13. Vetar_opterećena samo desna strana



3.14. Seizmički spektri

Naziv JedinstveniID	Vrsta crteža	Informacije	Crtež
FS1	Razdoblje	Vrsta norme - Eurokod Podtlo vrsta - D Smjer - Horizontalno Vrsta spektra - vrsta 1 Koef ubrzanja. ag - 0.00509684 ag - proračunsko ubrzanje tla - 0.05 beta - 0.2 q - faktor ponašanja - 1.5	

3.15. Grupe mase

Naziv	Slučaj opterećenja	Opis
MG1	G - Sopstvena težina	Sopstvena težina
MG2	G1 - Stalno opterećenje	Stalno opterećenje
MG3	P - Korisno opterećenje	Korisno opterećenje

3.16. Kombinacija grupa masa

Naziv	Grupa mase	Koef. [-]
CM1	MG1 - Sopstvena težina	1.00
	MG2 - Stalno opterećenje	1.00
	MG3 - Korisno opterećenje	0.30

3.17. Etaža

Naziv	Z-Dolje [mm]	Visina [mm]
FL1	0.00	5.10
FL2	5.10	1.75
FL3	6.85	0.00

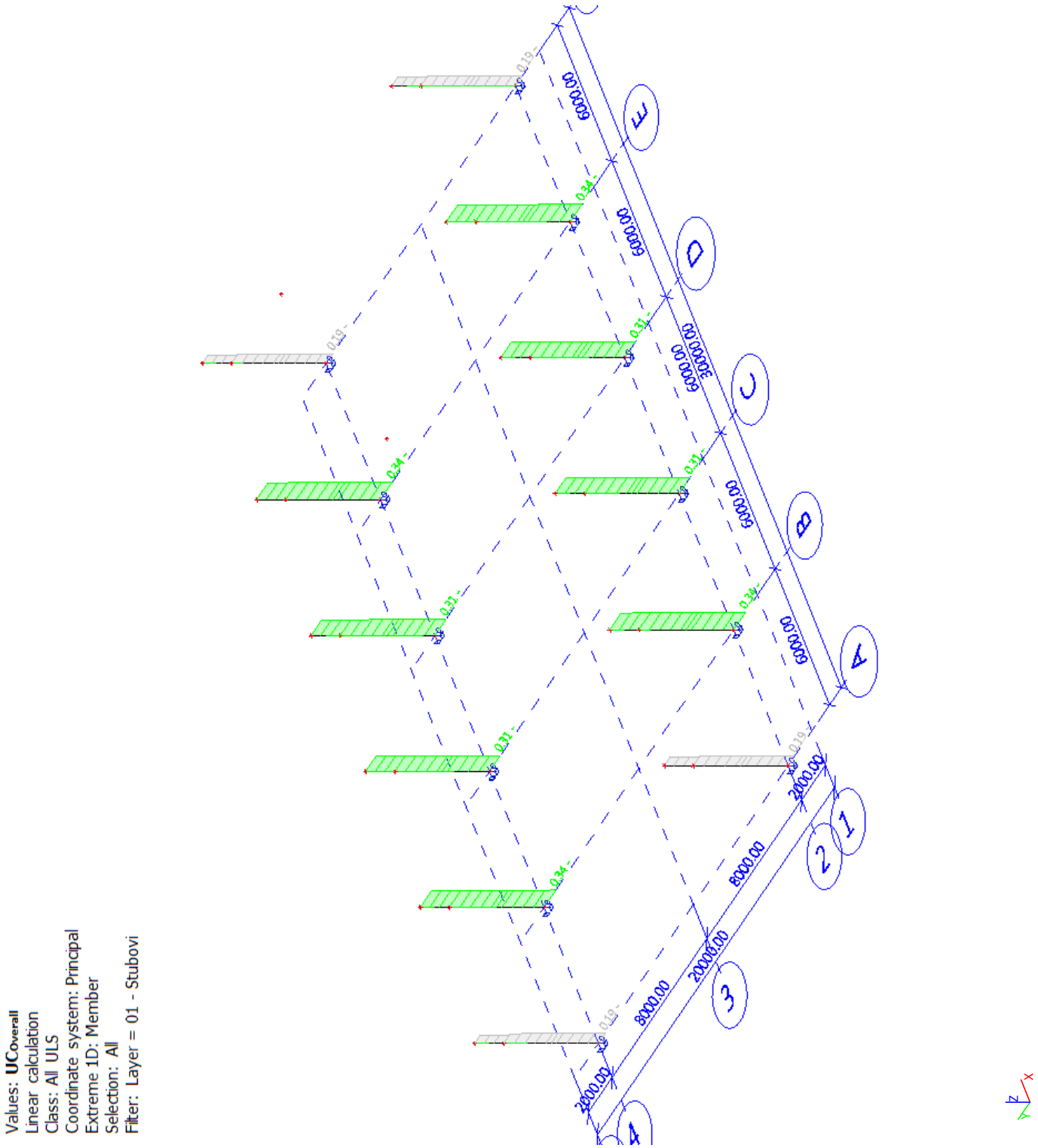
Objašnjenja simbola	
Z-Dolje	Z-Dolje
Visina	Visina

3.18. Vlastite frekvencije

N	f [Hz]	ω [1/s]	ω^2 [1/s^2]	T [s]
Kombinacija mase : CM1				
1	1.38	8.68	75.42	0.72
2	2.07	12.99	168.85	0.48
3	2.09	13.14	172.65	0.48
4	2.19	13.77	189.74	0.46
5	3.10	19.45	378.38	0.32
6	3.92	24.62	606.00	0.26

4. Nosivost i stabilnost konstruktivnih elemenata

4.1. EC-EN 1993 Ukupna provera_stubovi



4.2. EC-EN 1993 Provera stubova

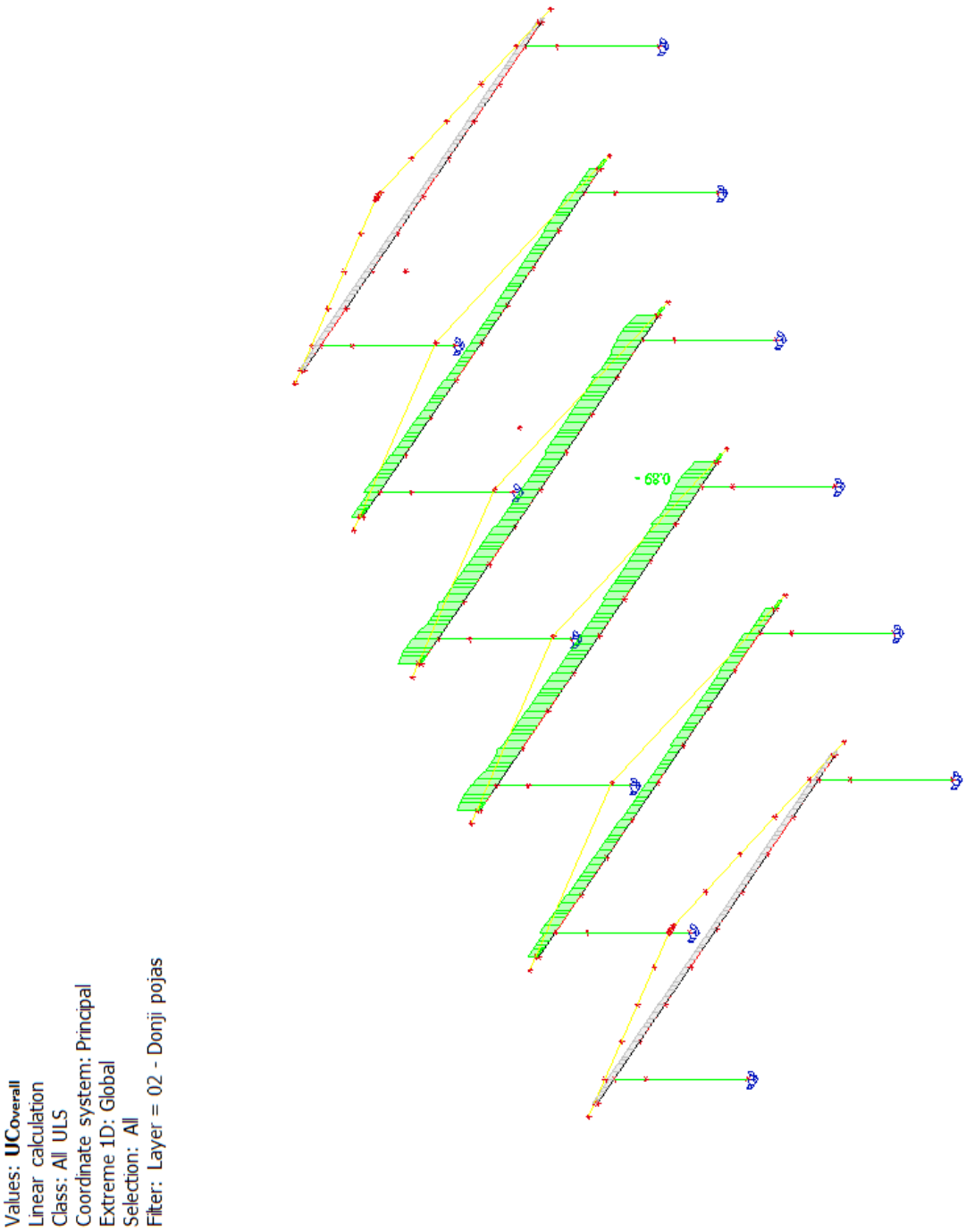
Linearni proračun
Klasa: All ULS
Koordinatni sistem: Glavni
Ekstremni 1D: Globalni
Odabir: Svi
Filtar: Sloj = 01 - Stubovi

Ukupna Unity Provjera

Naziv	dx [mm]	Slučaj	Poprečni presjek	Materijal	UC_{Ukupno} [-]	UC_{Sec} [-]	UC_{Stab} [-]
B8	0.00	ULS-Set B (auto)/1	HEA 160 - HEA160	S 235	**0.34**	0.11	0.34

Naziv	Kombinacijski ključ
ULS-Set B (auto)/1	1.35*G + 1.35*G1 + 1.50*S + 0.90*WmaxL

4.3. EC-EN 1993 Ukupna provera_donji pojas



4.4. EC-EN 1993 Provera donjeg pojasa

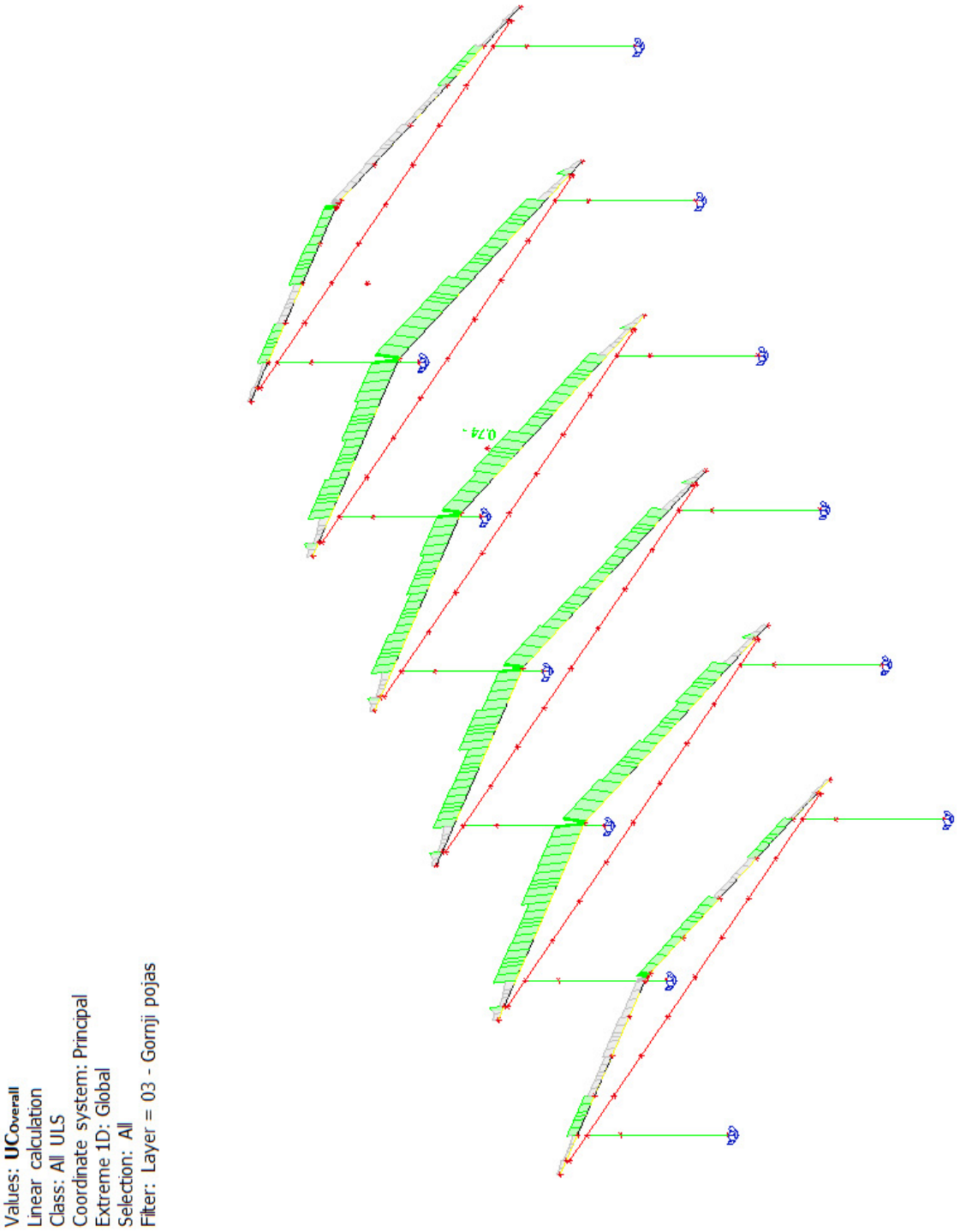
Linearni proračun
Klasa: All ULS
Koordinatni sistem: Glavni
Ekstremni 1D: Globalni
Odabir: Svi
Filtar: Sloj = 02 - Donji pojas

Ukupna Unity Provjera

Naziv	dx [mm]	Slučaj	Poprečni presjek	Materijal	UC_{Ukupno} [-]	UC_{Sec} [-]	UC_{Stab} [-]
B56	1300.00-	ULS-Set B (auto)/1	HEA 120 - HEA120	S 275	**0.89**	0.23	0.89

Naziv	Kombinacijski ključ
ULS-Set B (auto)/1	1.35*G + 1.35*G1 + 1.50*S + 0.90*WmaxD

4.5. EC-EN 1993 Ukupna provera_gornji pojas



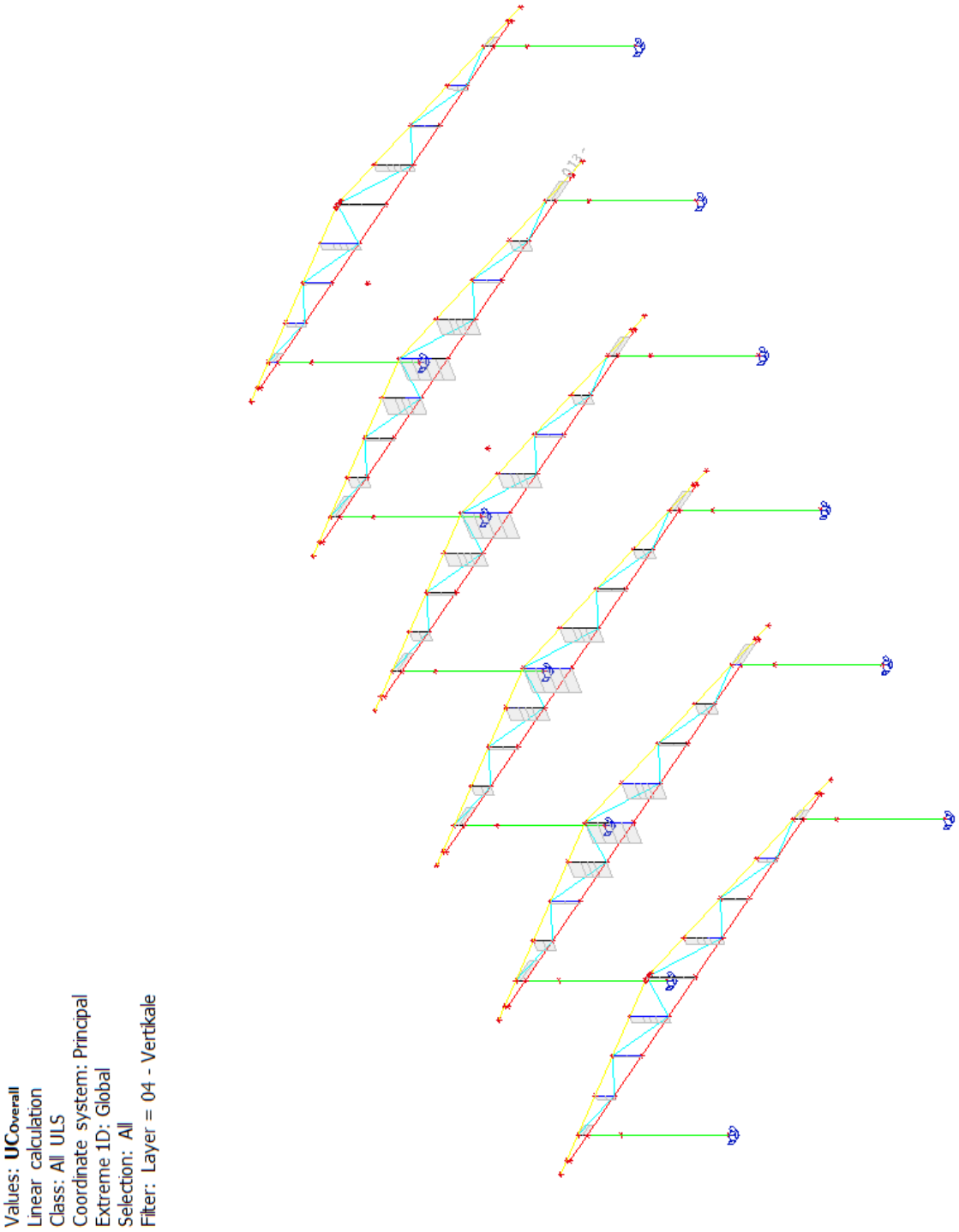
4.6. EC-EN 1993 Provera gornjeg pojasa

Linearni proračun
Klasa: All ULS
Koordinatni sistem: Glavni
Ekstremni 1D: Globalni
Odabir: Svi
Filtar: Sloj = 03 - Gornji pojas
Ukupna Unity Provjera

Naziv	dx [mm]	Slučaj	Poprečni presjek	Materijal	UC_{Ukupno} [-]	UC_{Sec} [-]	UC_{Stab} [-]
B79	4060.79-	ULS-Set B (auto)/1	HEA 120 - HEA120	S 275	**0.74**	0.27	0.74

Naziv	Kombinacijski ključ
ULS-Set B (auto)/1	1.35*G + 1.35*G1 + 1.50*S

4.7. EC-EN 1993 Ukupna provera_vertikale



4.8. EC-EN 1993 Provera vertikala

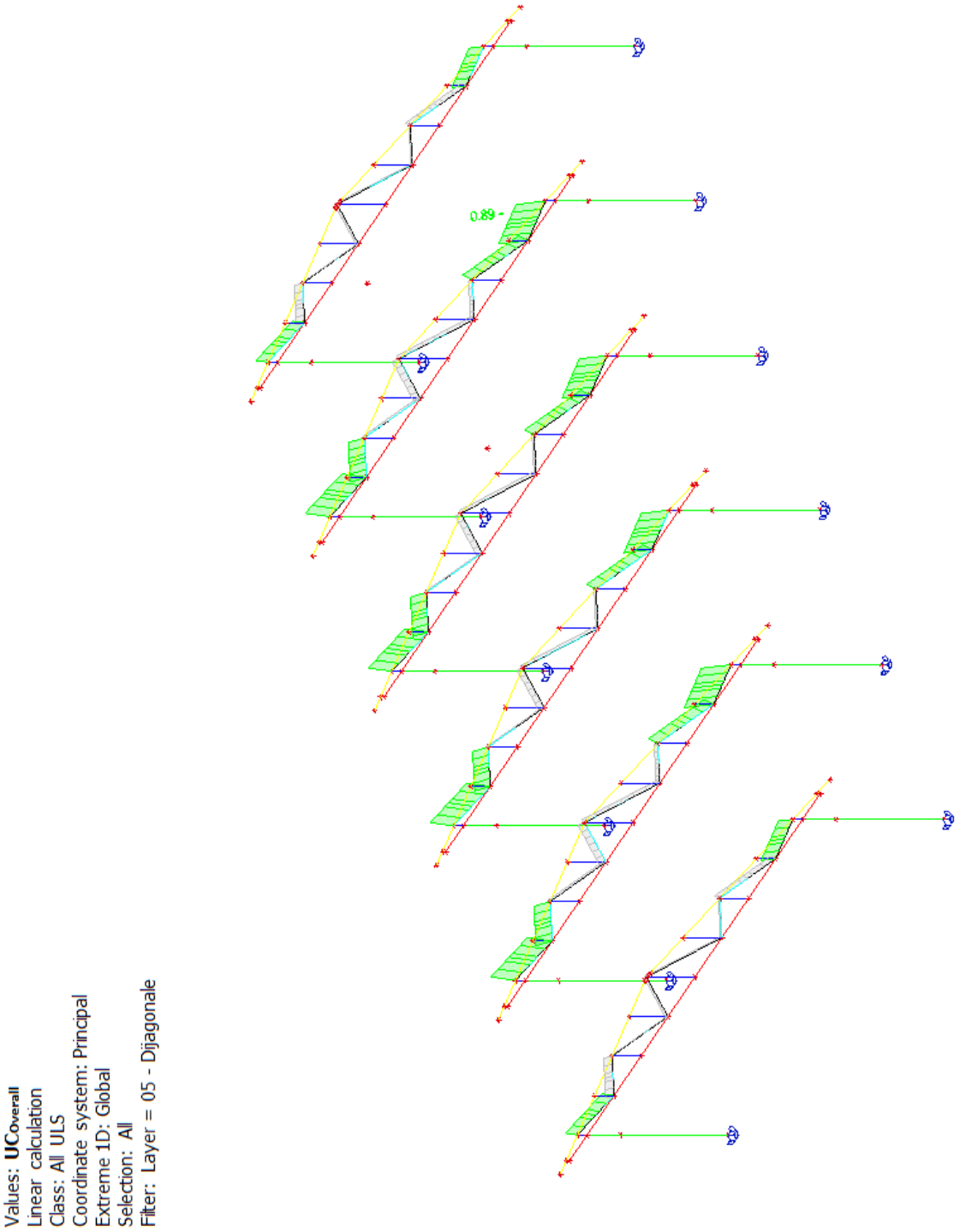
Linearni proračun
Klasa: All ULS
Koordinatni sistem: Glavni
Ekstremni 1D: Globalni
Odabir: Svi
Filtar: Sloj = 04 - Vertikale

Ukupna Unity Provjera

Naziv	dx [mm]	Slučaj	Poprečni presjek	Materijal	UC_{Ukupno} [-]	UC_{Sec} [-]	UC_{Stab} [-]
B103	0.00	ULS-Set B (auto)/1	HEA 120 - HEA120	S 275	**0.13**	0.13	0.00

Naziv	Kombinacijski ključ
ULS-Set B (auto)/1	1.35*G + 1.35*G1 + 1.50*S

4.9. EC-EN 1993 Ukupna provera_dijagonale



4.10. EC-EN 1993 Provera dijagonala

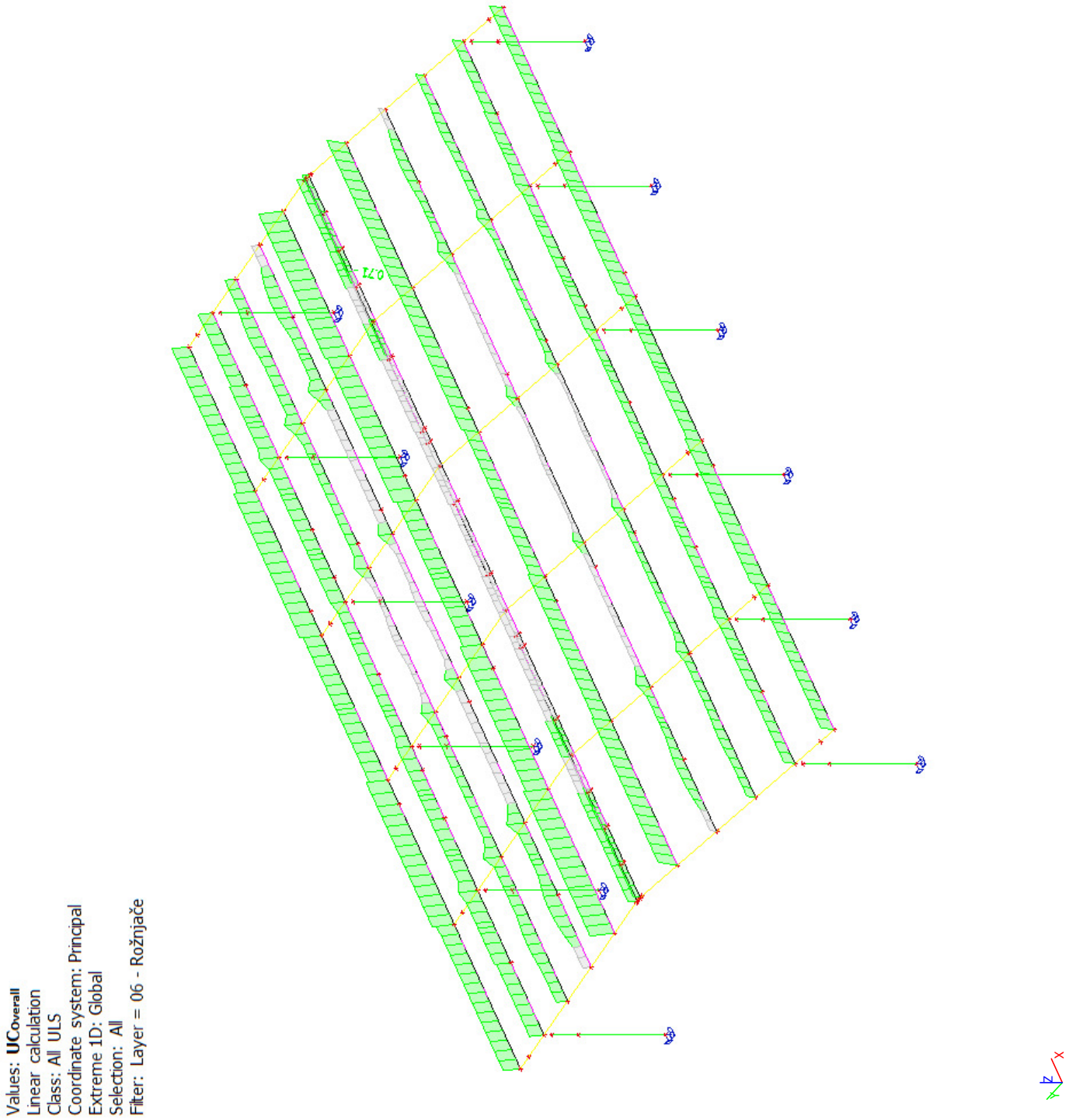
Linearni proračun
Klasa: All ULS
Koordinatni sistem: Glavni
Ekstremni 1D: Globalni
Odabir: Svi
Filtar: Sloj = 05 - Dijagonale

Ukupna Unity Provjera

Naziv	dx [mm]	Slučaj	Poprečni presjek	Materijal	UC_{Ukupno} [-]	UC_{Sec} [-]	UC_{Stab} [-]
B118	2030.39	ULS-Set B (auto)/1	80x80x3 - CFRHS80X80X3	S 235	**0.89**	0.89	0.00

Naziv	Kombinacijski ključ
ULS-Set B (auto)/1	1.35*G + 1.35*G1 + 1.50*S

4.11. EC-EN 1993 Ukupna provera_rožnjače



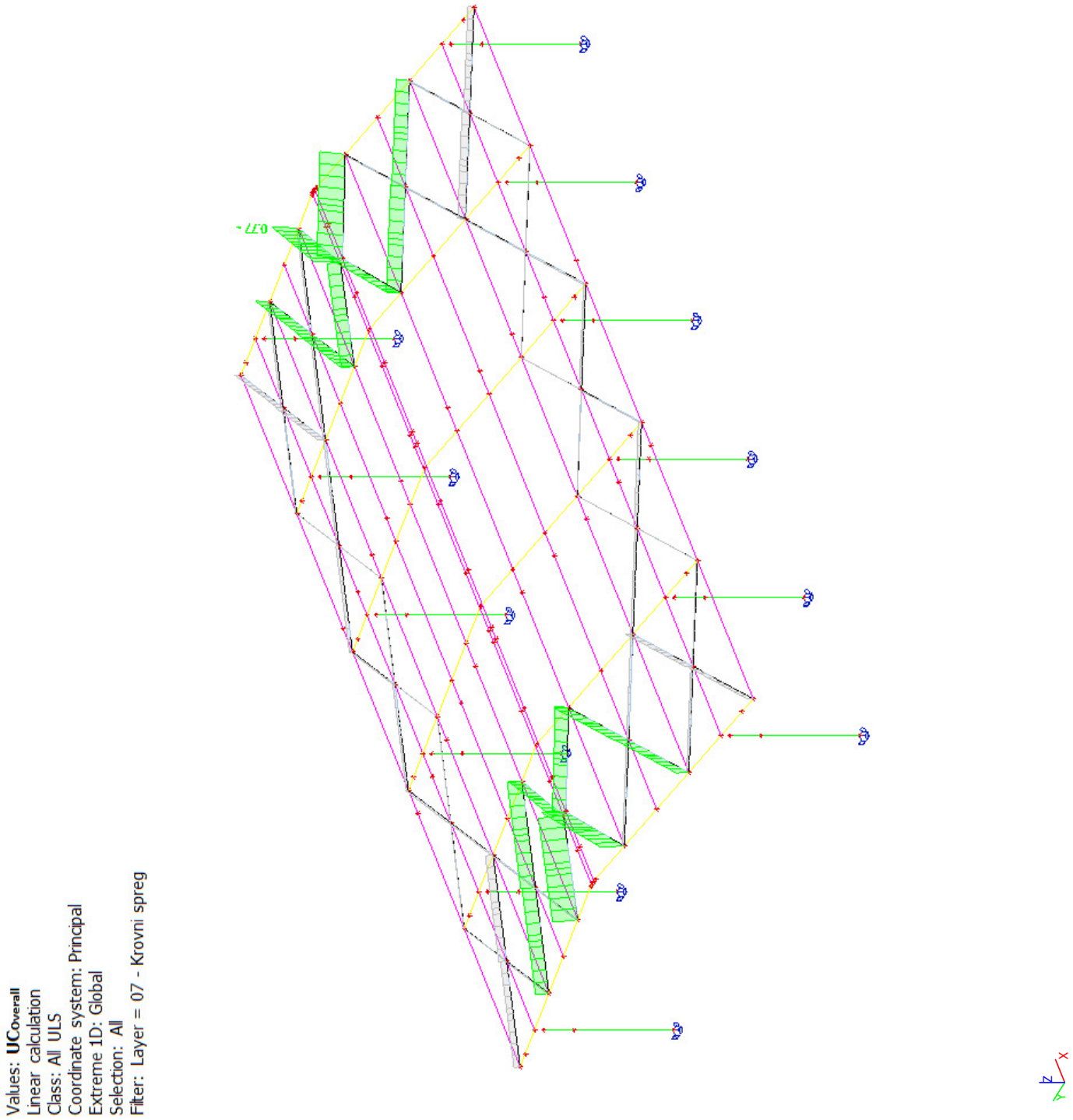
4.12. EC-EN 1993 Provera rožnjača

Linearni proračun
Klasa: All ULS
Koordinatni sistem: Glavni
Ekstremni 1D: Globalni
Odabir: Svi
Filtar: Sloj = 06 - Rožnjače
Ukupna Unity Provjera

Naziv	dx [mm]	Slučaj	Poprečni presjek	Materijal	UC_{Ukupno} [-]	UC_{Sec} [-]	UC_{Stab} [-]
B291	5000.00+	ULS-Set B (auto)/1	140x80x4 - CFRHS140X80X4	S 235	**0.71**	0.41	0.71

Naziv	Kombinacijski ključ
ULS-Set B (auto)/1	G + G1 + 1.50*W

4.13. EC-EN 1993 Ukupna provera_krovni spreg



4.14. EC-EN 1993 Provera krovnog sprega

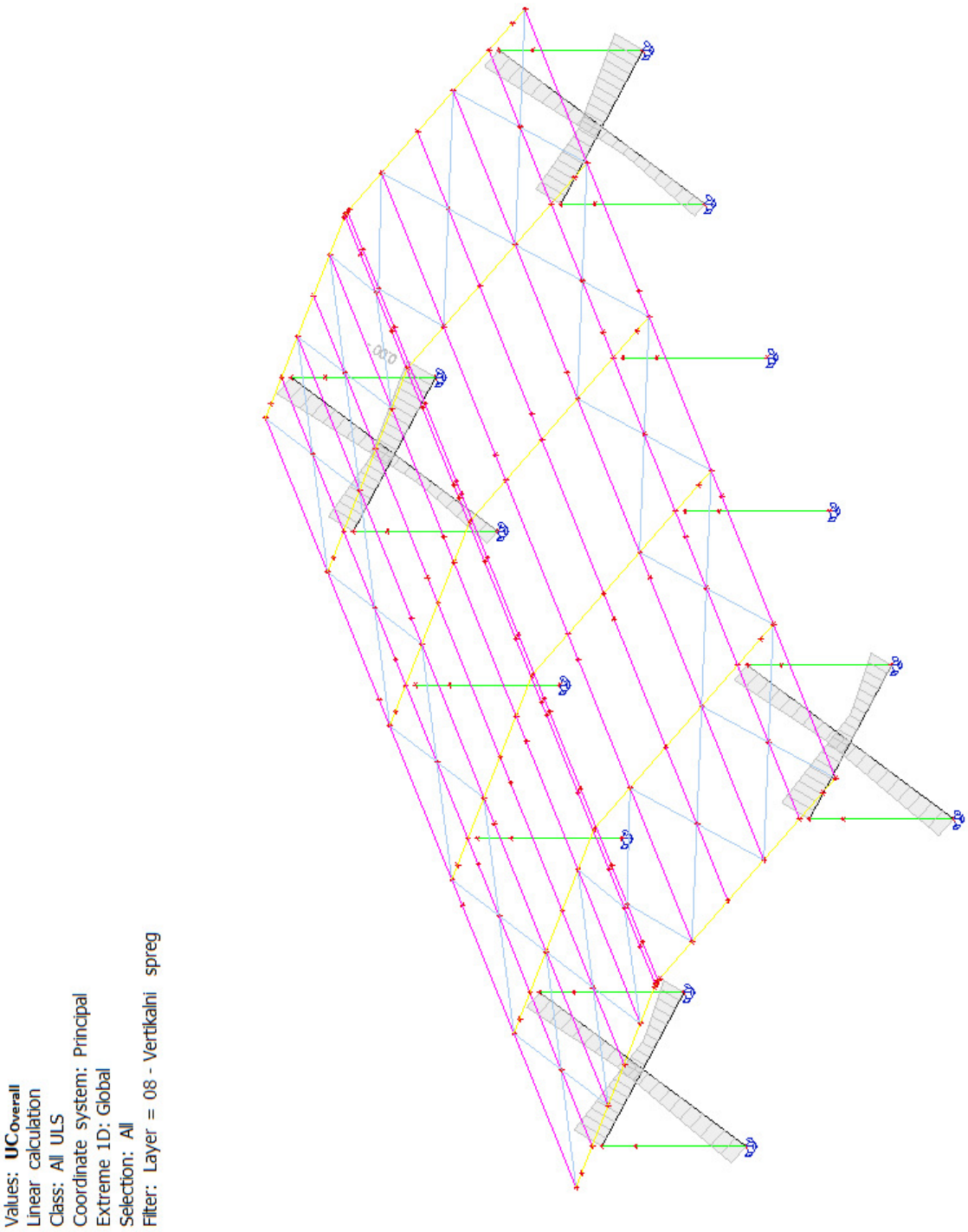
Linearni proračun
Klasa: All ULS
Koordinatni sistem: Glavni
Ekstremni 1D: Globalni
Odabir: Svi
Filtar: Sloj = 07 - Krovni spreg

Ukupna Unity Provjera

Naziv	dx [mm]	Slučaj	Poprečni presjek	Materijal	UC_{Ukupno} [-]	UC_{Sec} [-]	UC_{Stab} [-]
B161	0.00	ULS-Set B (auto)/1	60x60x3 - CFRHS60X60X3	S 235	**0.77**	0.21	0.77

Naziv	Kombinacijski ključ
ULS-Set B (auto)/1	1.35*G + 1.35*G1 + 1.50*S

4.15. EC-EN 1993 Ukupna provera_vertikalni spreg



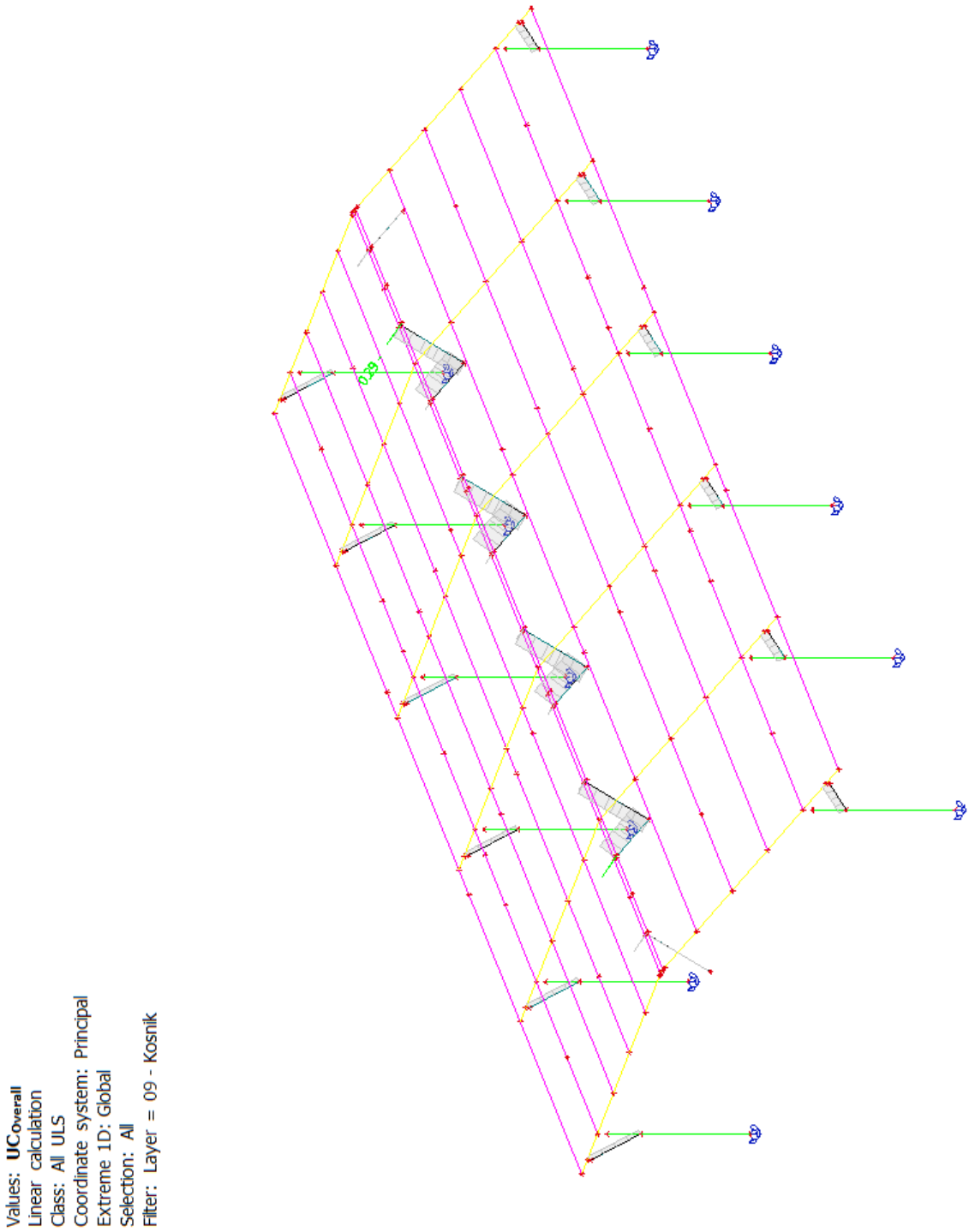
4.16. EC-EN 1993 Provera vertikalnog sprega

Linearni proračun
Klasa: All ULS
Koordinatni sistem: Glavni
Ekstremni 1D: Globalni
Odabir: Svi
Filtar: Sloj = 08 - Vertikalni spreg
Ukupna Unity Provjera

Naziv	dx [mm]	Slučaj	Poprečni presjek	Materijal	UC_{Ukupno} [-]	UC_{Sec} [-]	UC_{Stab} [-]
B219	0.00	ULS-Seis (auto)/1	80x80x3 - CFRHS80X80X3	S 235	**0.00**	0.00	0.00

Naziv	Kombinacijski ključ
ULS-Seis (auto)/1	G + G1 - Sx - 0.30*Sy - Accidental torsional moments for Sx - 0.30*Accidental torsional moments for Sy

4.17. EC-EN 1993 Ukupna provera_kosnici



4.18. EC-EN 1993 Provera kosnika

Linearni proračun
Klasa: All ULS
Koordinatni sistem: Glavni
Ekstremni 1D: Globalni
Odabir: Svi
Filtar: Sloj = 09 - Kosnik

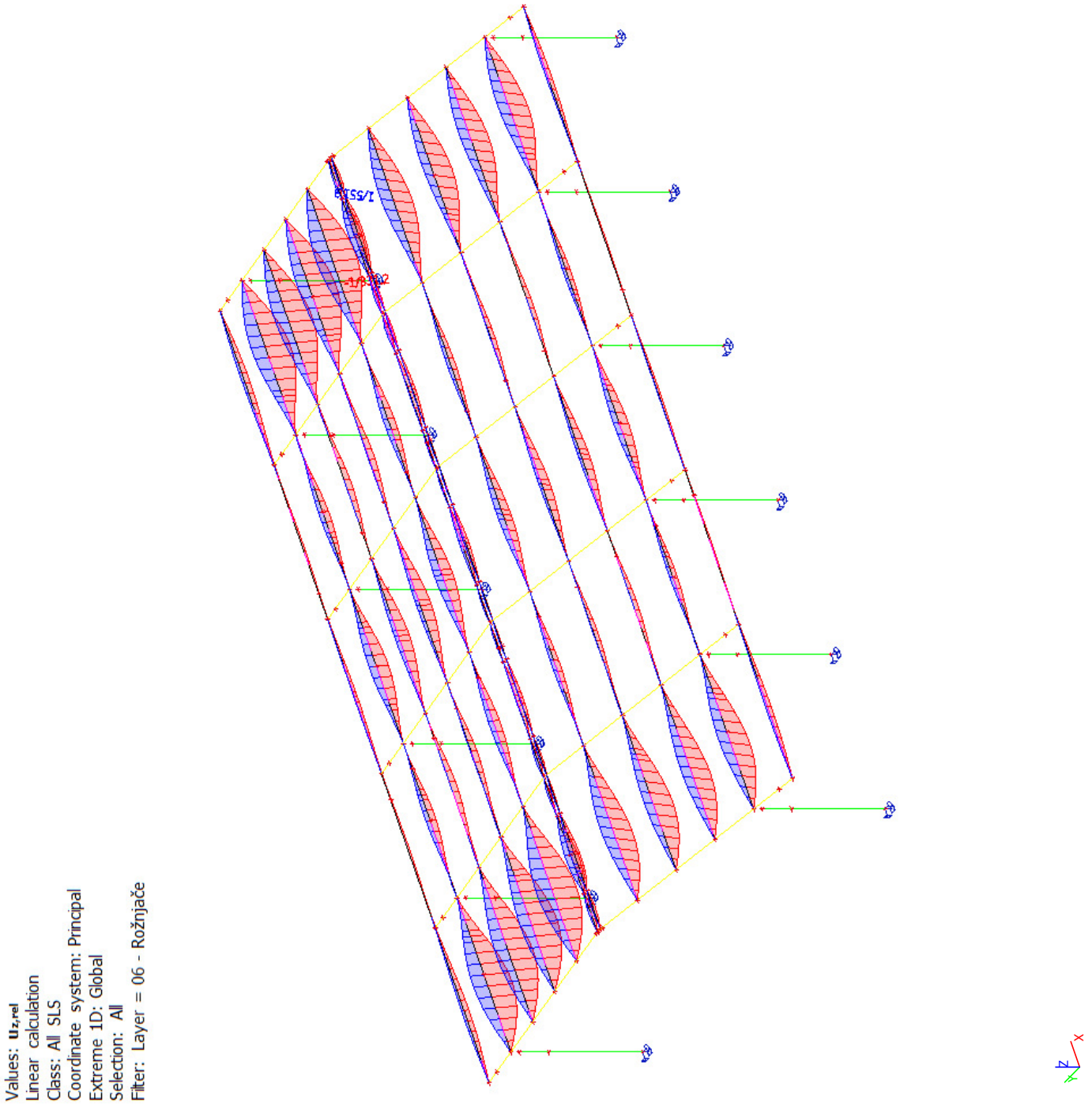
Ukupna Unity Provjera

Naziv	dx [mm]	Slučaj	Poprečni presjek	Materijal	UC_{Ukupno} [-]	UC_{Sec} [-]	UC_{Stab} [-]
B237	98.50-	ULS-Set B (auto)/1	L100x10 - L100X10	S 235	**0.29**	0.29	0.00

Naziv	Kombinacijski ključ
ULS-Set B (auto)/1	1.35*G + 1.35*G1 + 0.75*SD + 1.50*WmaxL

5. Pomeranja

5.1. Ugib rožnjača



5.2. Ugib rožnjača

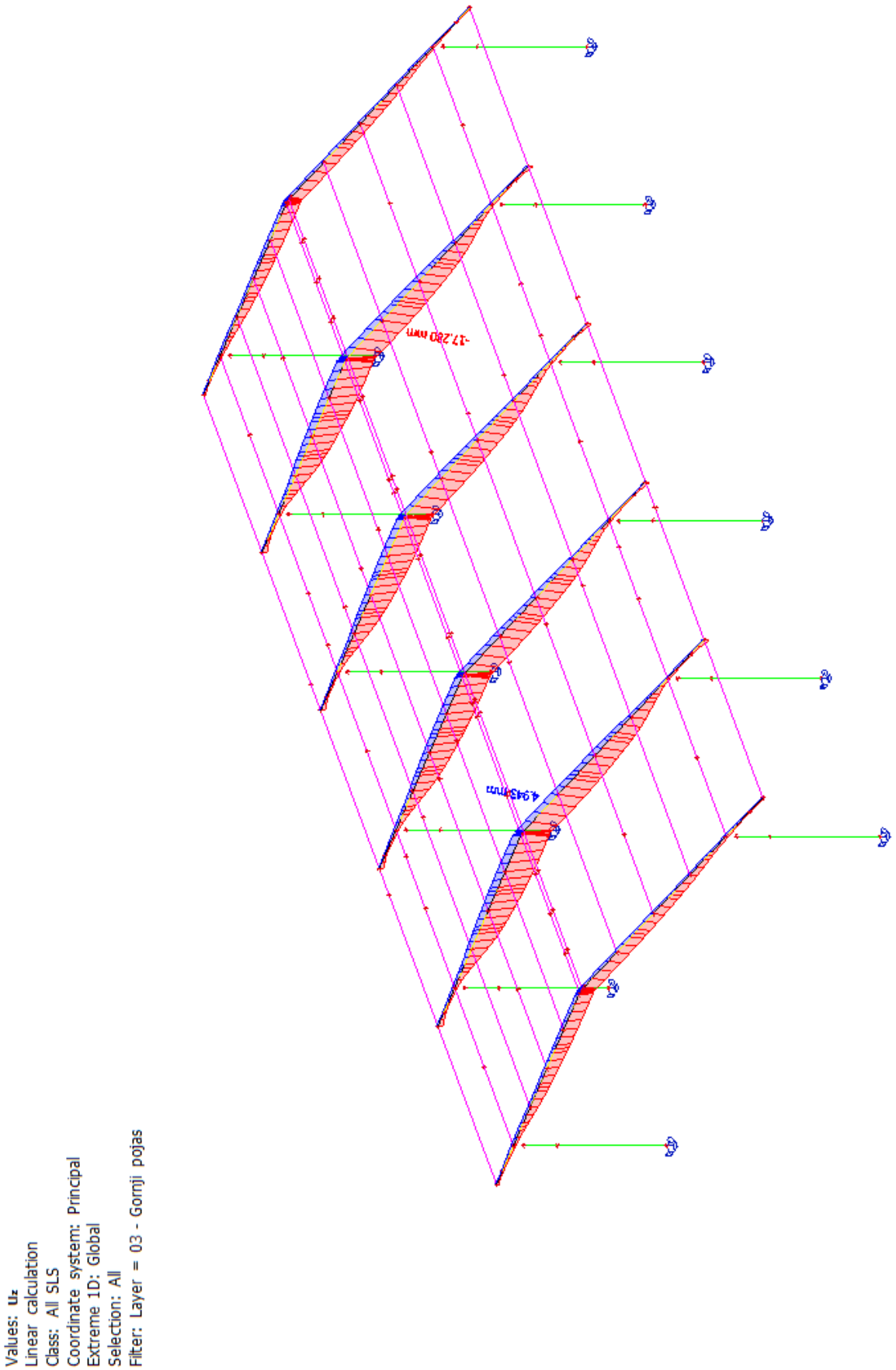
Linearni proračun
Klasa: All SLS
Koordinatni sistem: Glavni
Ekstremni 1D: Globalni
Odabir: Svi
Filtar: Sloj = 06 - Rožnjače

Relativne deformacije

Naziv	dx [mm]	Slučaj	u_y [mm]	$u_{y,rel}$ [1/xx]	u_z [mm]	$u_{z,rel}$ [1/xx]
B150	8200.00	SLS-Char (auto)/1	**-6.779**	**-1/885.1**	-16.960	-1/353.8
B149	5857.14	SLS-Char (auto)/2	**0.422**	**1/7113.4**	-2.903	-1/2067.1
B298	2571.43	SLS-Char (auto)/1	-0.211	-1/10000.0	**-18.114**	**-1/331.2**
B291	8200.00	SLS-Char (auto)/3	-1.489	-1/4029.6	**10.883**	**1/551.3**

Naziv	Kombinacijski ključ
SLS-Char (auto)/1	G + G1 + S
SLS-Char (auto)/2	G + G1 + SL + 0.60*W
SLS-Char (auto)/3	G + G1 + W

5.3. Ugib vrha objekta



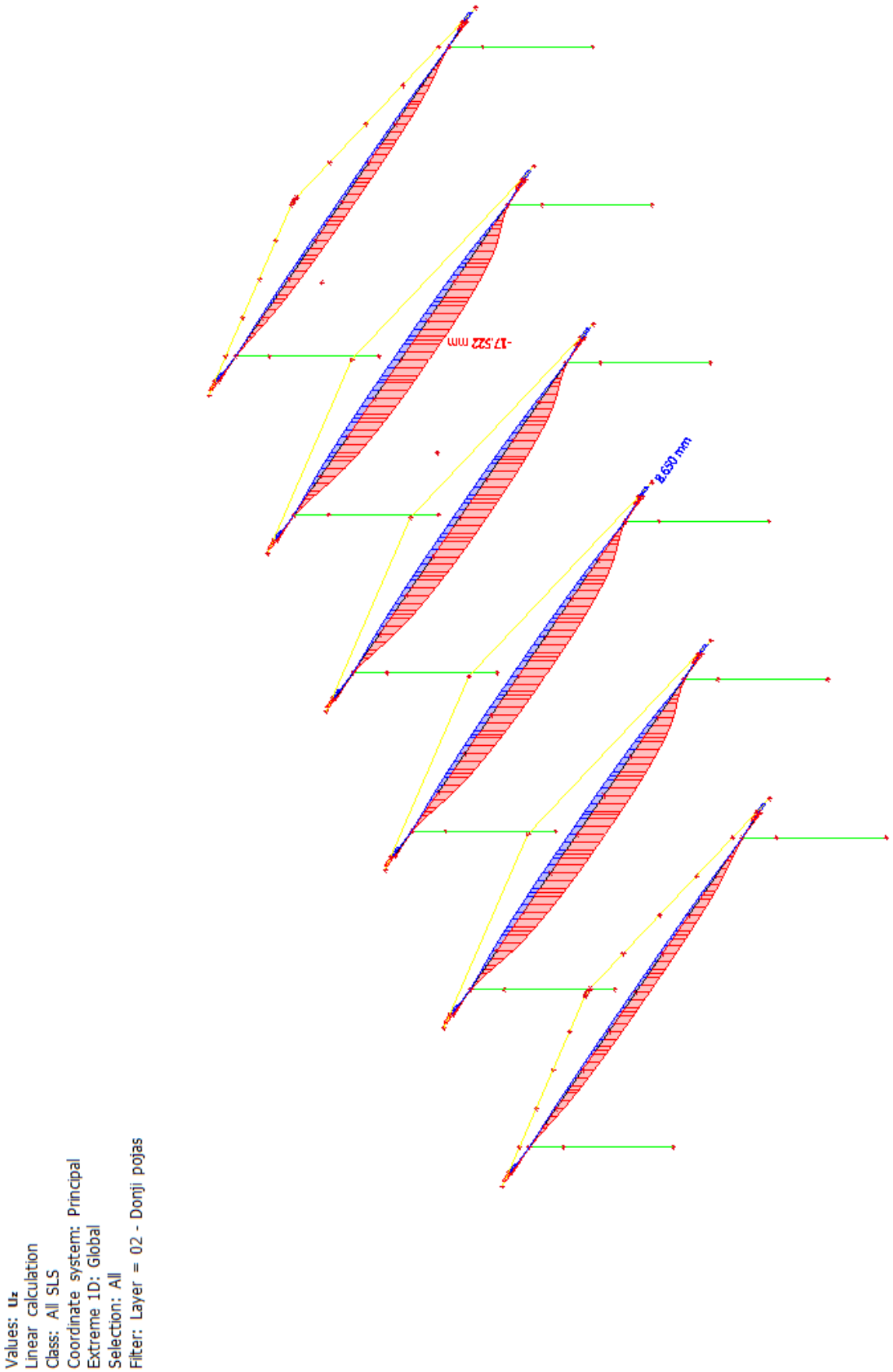
5.4. Ugib vrha objekta

Linearni proračun
Klasa: All SLS
Koordinatni sistem: Globalni
Ekstremni 1D: Globalni
Odabir: Svi
Filtar: Sloj = 03 - Gornji pojas
Deformacije

Naziv	dx [mm]	Slučaj	u_x [mm]	u_y [mm]	u_z [mm]	φ_x [deg]	φ_y [deg]	φ_z [deg]	U_{ukupno} [mm]
B121	0.00	SLS-Char (auto)/1	**-0.267**	0.000	-8.389	0.000	-0.068	0.000	8.393
B16	0.00	SLS-Char (auto)/1	**0.266**	0.000	-8.389	0.000	0.068	0.000	8.393
B79	8121.58-	SLS-Char (auto)/2	0.009	**-8.774**	-0.096	0.001	0.013	0.002	8.774
B59	8121.58-	SLS-Char (auto)/3	-0.010	**8.774**	-0.096	-0.001	-0.013	0.002	8.774
B100	1547.80	SLS-Char (auto)/1	-0.179	0.430	**-17.468**	-0.004	0.035	0.009	**17.474**
B37	1547.80	SLS-Char (auto)/4	-0.060	-0.151	**4.990**	-0.003	0.018	0.004	4.993
B100	6903.34	SLS-Char (auto)/1	0.053	-0.407	-5.893	**-0.308**	0.131	0.023	5.907
B101	6903.34	SLS-Char (auto)/1	0.053	0.407	-5.893	**0.308**	0.131	-0.023	5.907
B16	9441.33-	SLS-Char (auto)/1	-0.182	-0.737	-0.138	0.039	**-0.263**	-0.049	0.771
B122	9441.33-	SLS-Char (auto)/1	0.180	0.737	-0.138	-0.039	**0.263**	-0.049	0.771
B16	10151.97	SLS-Char (auto)/1	-0.242	-0.576	-1.085	0.090	-0.263	**-0.052**	1.252
B17	10151.97	SLS-Char (auto)/1	-0.242	0.576	-1.085	-0.090	-0.263	**0.052**	1.252

Naziv	Kombinacijski ključ
SLS-Char (auto)/1	G + G1 + S
SLS-Char (auto)/2	G + G1 + 0.50*SD + WmaxD
SLS-Char (auto)/3	G + G1 + 0.50*SL + WmaxL
SLS-Char (auto)/4	G + G1 + W

5.5. Ugib donjeg pojasa



5.6. Ugib donjeg pojasa

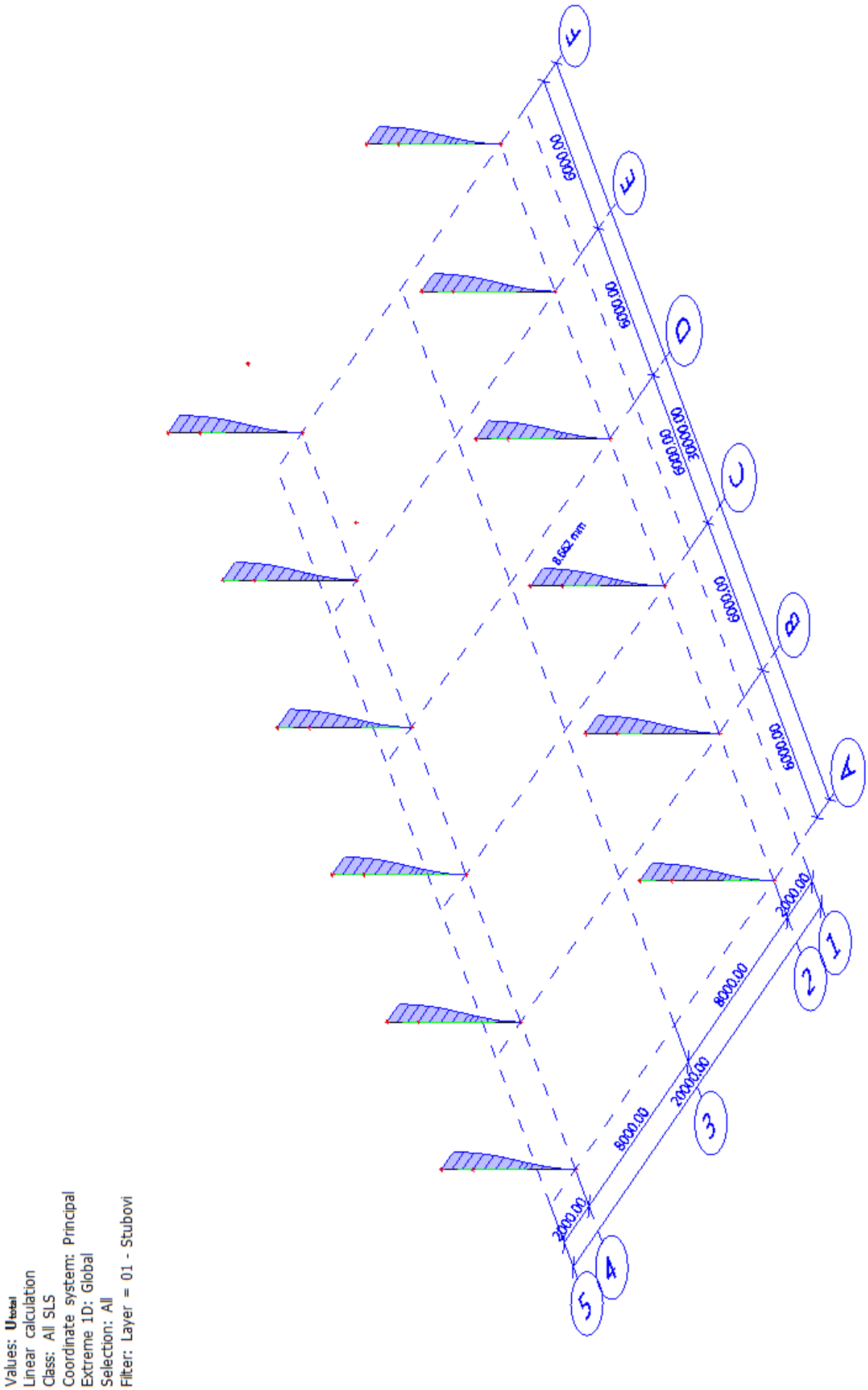
Linearni proračun
Klasa: All SLS
Koordinatni sistem: Globalni
Ekstremni 1D: Globalni
Odabir: Svi
Filtar: Sloj = 02 - Donji pojas

Deformacije

Naziv	dx [mm]	Slučaj	u_x [mm]	u_y [mm]	u_z [mm]	φ_x [deg]	φ_y [deg]	φ_z [deg]	U_{ukupno} [mm]
B13	9300.00	SLS-Char (auto)/1	**-7.156**	0.000	-8.398	0.000	-0.264	0.000	11.033
B119	9300.00	SLS-Char (auto)/1	**7.155**	0.000	-8.398	0.000	**0.263**	0.000	11.032
B56	3300.00-	SLS-Char (auto)/2	0.192	**-8.753**	-2.202	-0.069	-0.011	-0.003	9.027
B78	3300.00-	SLS-Char (auto)/3	-0.191	**8.753**	-2.202	0.069	0.011	-0.003	9.027
B98	8500.00	SLS-Char (auto)/1	0.950	-0.170	**-17.522**	-0.001	0.177	-0.006	**17.548**
B35	7700.00	SLS-Char (auto)/4	-0.160	0.086	**4.956**	0.001	0.079	0.001	4.960
B98	2500.00	SLS-Char (auto)/1	-0.401	-1.340	-5.815	**-0.312**	0.177	-0.004	5.981
B99	2500.00	SLS-Char (auto)/1	-0.401	1.340	-5.815	**0.312**	0.177	0.004	5.981
B14	4500.00	SLS-Char (auto)/1	-3.354	0.621	-6.632	0.061	-0.264	**-0.068**	7.458
B13	4500.00	SLS-Char (auto)/1	-3.354	-0.621	-6.632	-0.061	**-0.264**	**0.068**	7.458

Naziv	Kombinacijski ključ
SLS-Char (auto)/1	G + G1 + S
SLS-Char (auto)/2	G + G1 + 0.50*SD + WmaxD
SLS-Char (auto)/3	G + G1 + 0.50*SL + WmaxL
SLS-Char (auto)/4	G + G1 + W

5.7. Pomeranje vrha stubova



5.8. Pomeranje vrha stubova

Linearni proračun
Klasa: All SLS
Koordinatni sistem: Globalni
Ekstremni 1D: Globalni
Odabir: Svi
Filtar: Sloj = 01 - Stubovi

Deformacije

Naziv	dx [mm]	Slučaj	u_x [mm]	u_y [mm]	u_z [mm]	φ_x [deg]	φ_y [deg]	φ_z [deg]	U_{ukupno} [mm]
B6	5100.00	SLS-Char (auto)/1	**-0.384**	1.253	-0.459	-0.007	**-0.004**	-0.007	1.389
B10	5100.00	SLS-Char (auto)/2	-0.093	**-8.661**	-0.087	0.044	-0.001	0.003	8.662
B5	5100.00	SLS-Char (auto)/3	-0.093	**8.661**	-0.087	-0.044	-0.001	-0.003	**8.662**
B3	5100.00	SLS-Char (auto)/1	**0.384**	1.253	**-0.459**	-0.007	**0.004**	0.007	1.389
B3	5100.00	SLS-Char (auto)/4	-0.115	-0.326	**0.134**	-0.002	-0.001	0.002	0.370
B6	2166.67	SLS-Char (auto)/3	-0.026	3.603	-0.029	**-0.145**	-0.001	-0.002	3.603
B11	2166.67	SLS-Char (auto)/2	-0.026	-3.603	-0.029	**0.145**	-0.001	0.002	3.603
B12	5100.00	SLS-Char (auto)/1	0.196	-0.729	-0.218	-0.001	0.002	**-0.035**	0.785
B7	5100.00	SLS-Char (auto)/1	0.196	0.729	-0.218	0.001	0.002	**0.035**	0.785

Naziv	Kombinacijski ključ
SLS-Char (auto)/1	G + G1 + S
SLS-Char (auto)/2	G + G1 + 0.50*SD + WmaxD
SLS-Char (auto)/3	G + G1 + 0.50*SL + WmaxL
SLS-Char (auto)/4	G + G1 + W

6. Iskaz materijala

Odabir: Svi
Vrsta sortiranja: Materijal

Sažetak

Materijal	Masa [kg]	Površina [mm^2]	Volumen [cm^3]
Steel	14359.601	505354137.41	1829248.586
Ukupno	14359.601	505354137.41	1829248.586

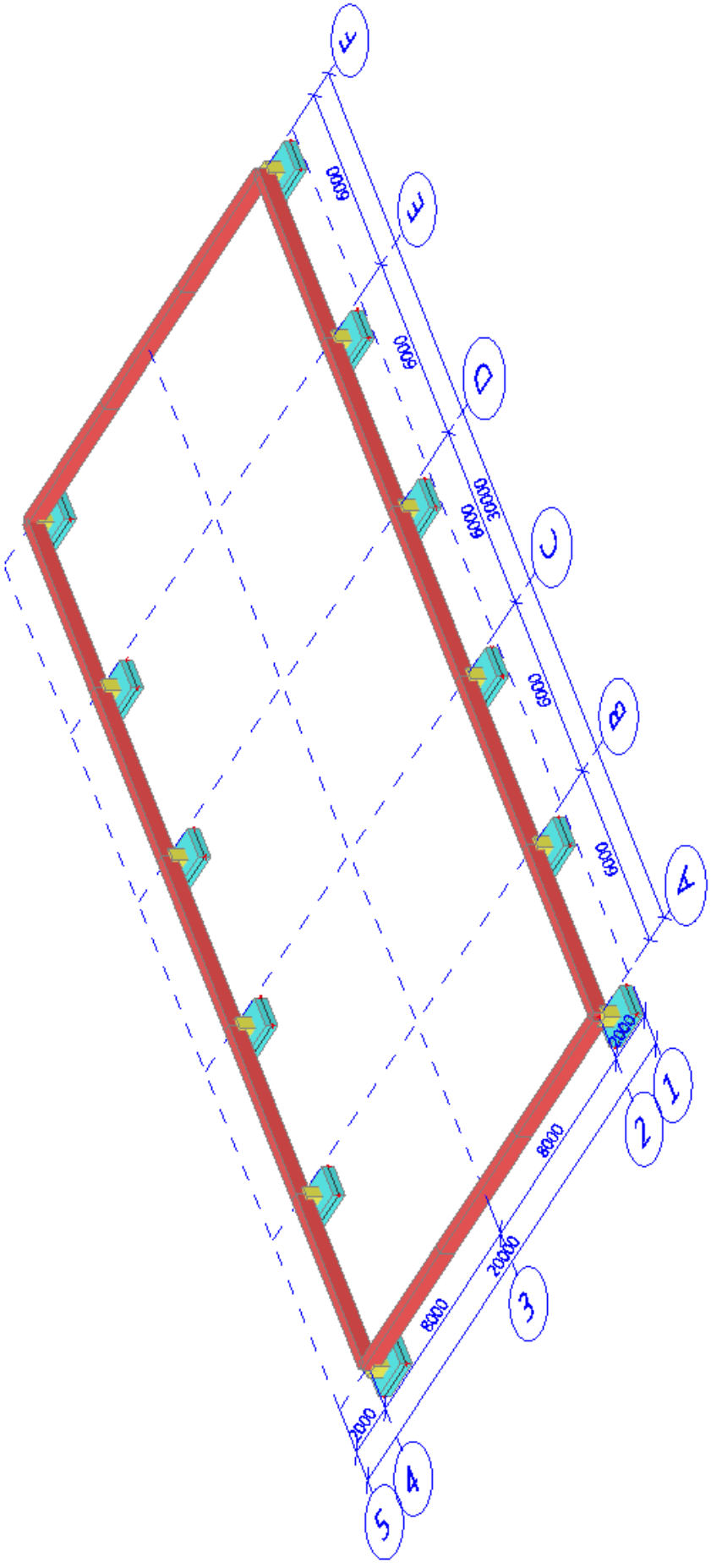
Napomena: Vrijednost 'Površine' za 1D elemente predstavlja ukupnu izloženu površinu, dok za 2D elemente ona odgovara samo površini centralnog područja.

Čelik (1D)

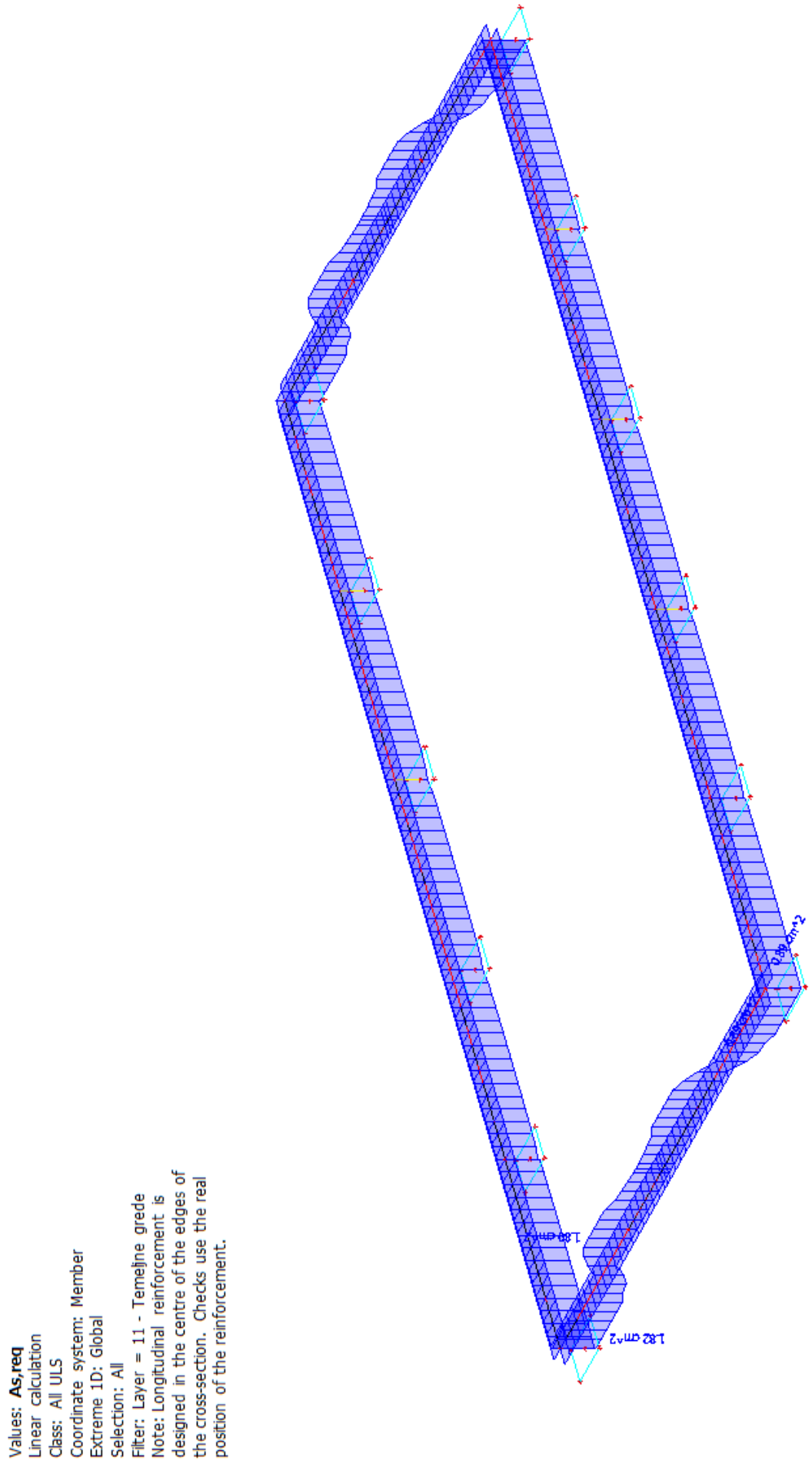
Materijal	Gustoća [kg/m^3]	Masa [kg]	Površina [mm^2]	Volumen [cm^3]
S 235	7850.000	9611.082	343487741.08	1224341.669
S 275	7850.000	4748.519	161866396.33	604906.917
Ukupno		14359.601	505354137.41	1829248.586

7. Dimenzionisanje temelja

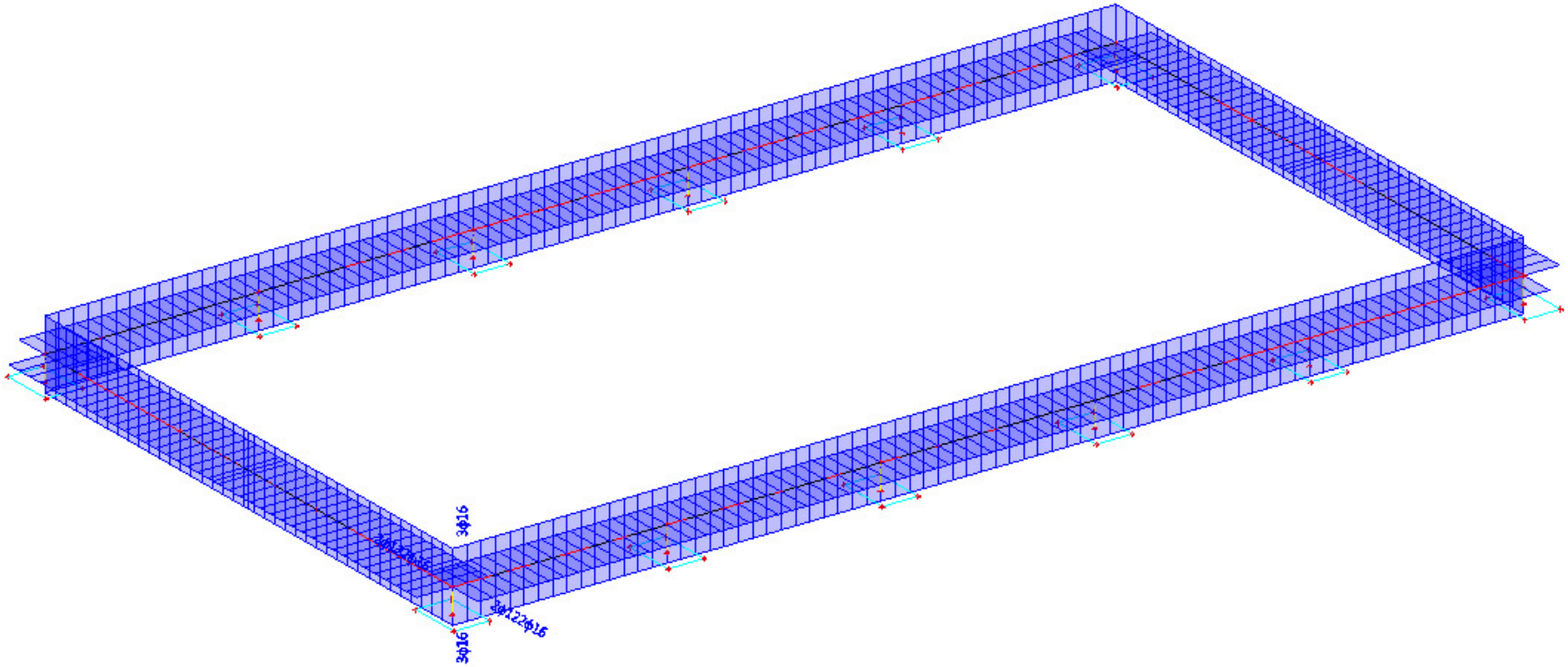
7.1. Izometrija temelja



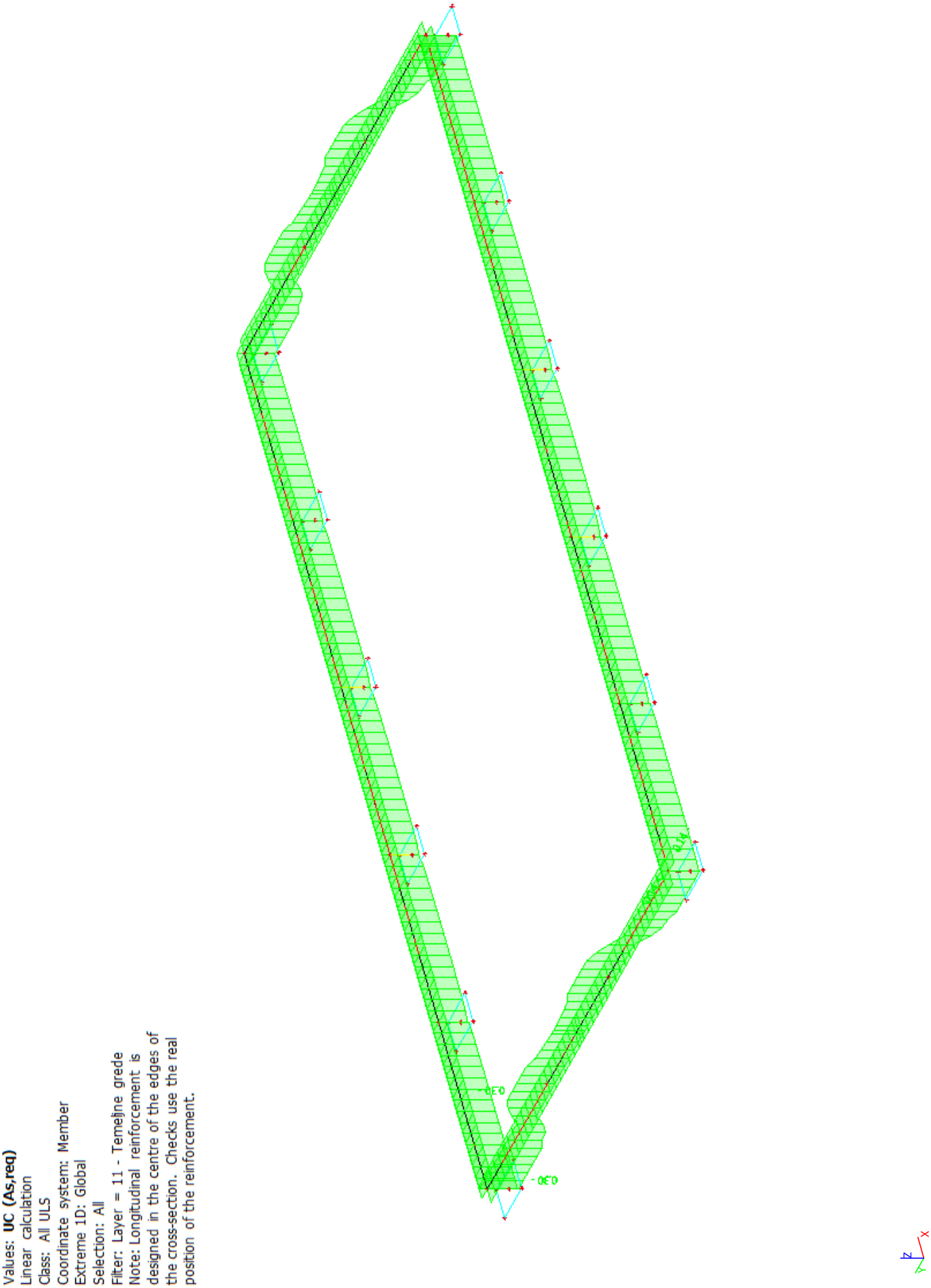
7.2. Potrebna podužna armatura temeljnih greda



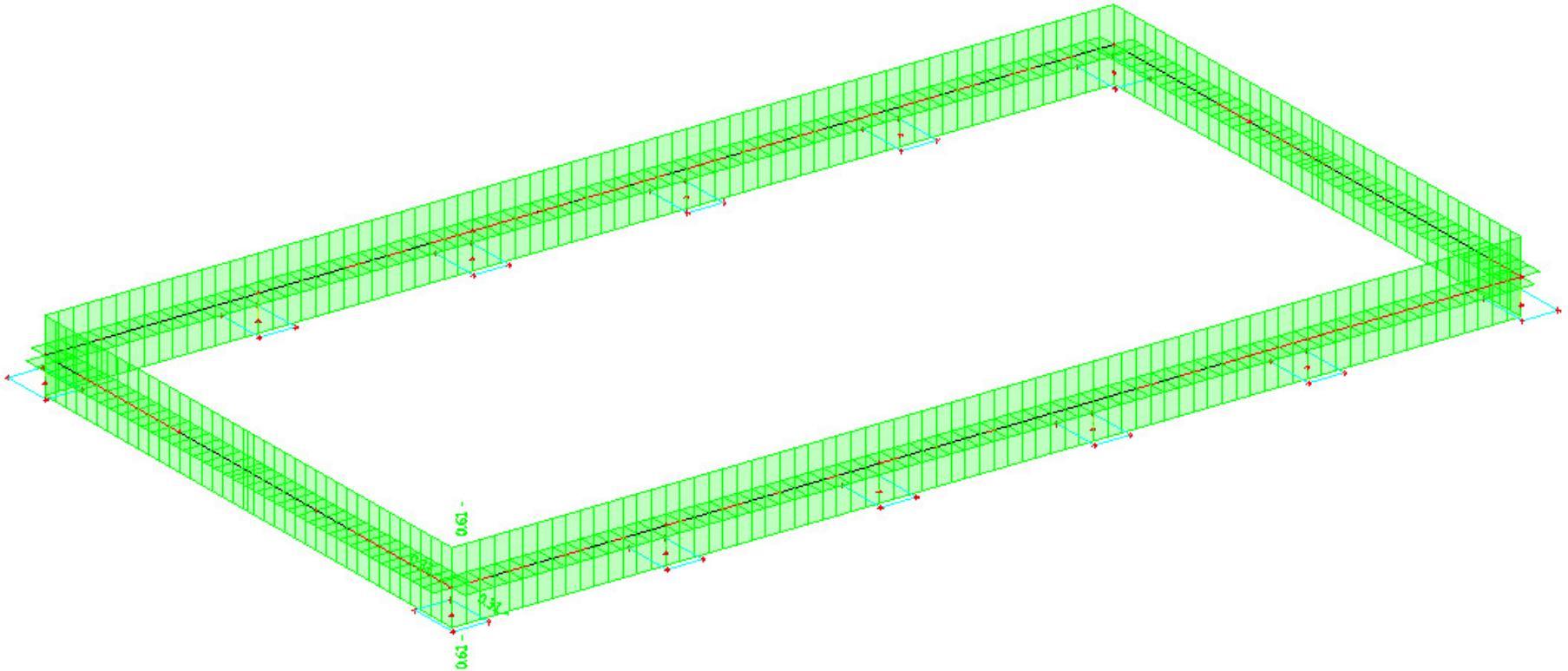
Values: **As,prov (ϕ)**
Linear calculation
Class: All ULS
Coordinate system: Member
Extreme 1D: Global
Selection: All
Filter: Layer = 11 - Temeljne grede
Note: Longitudinal reinforcement is designed in the centre of the edges of the cross-section. Checks use the real position of the reinforcement.



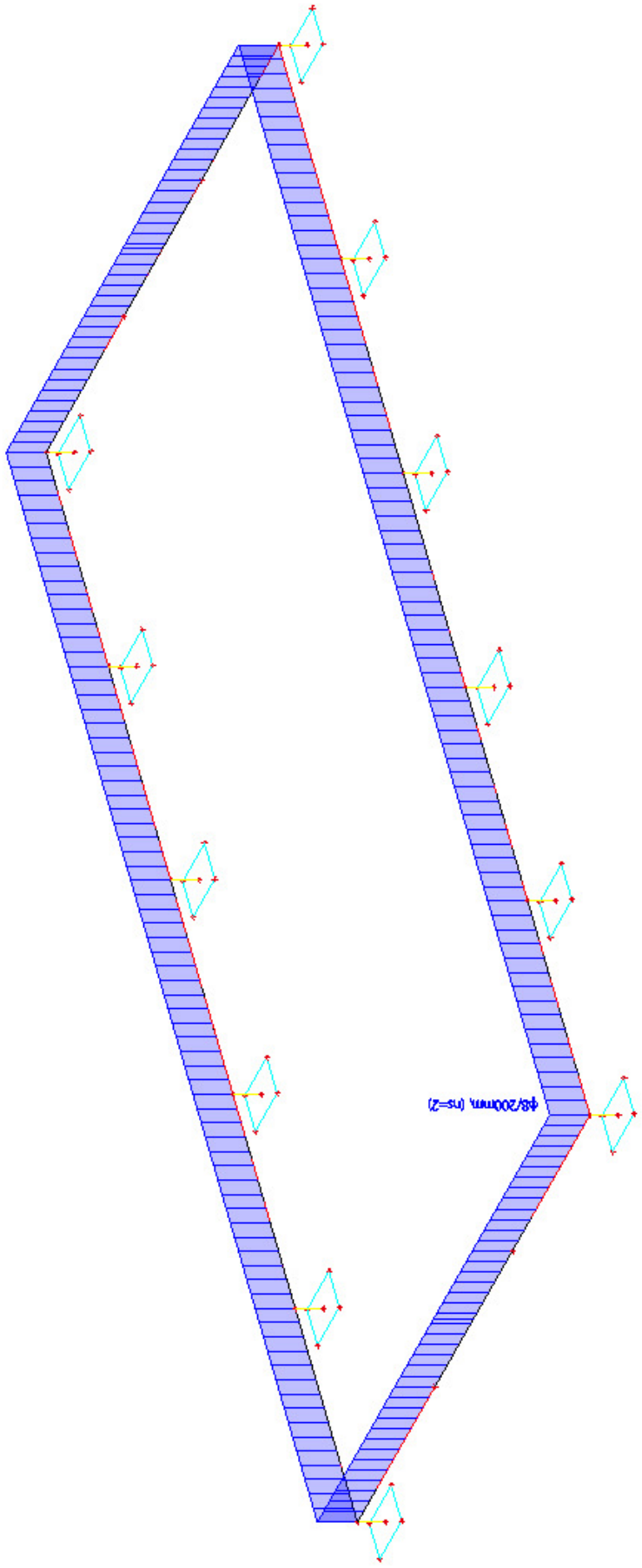
7.4. Ukupna provera podužne armature temeljnih greda



Values: **UC (As,max)**
Linear calculation
Class: All ULS
Coordinate system: Member
Extreme 1D: Global
Selection: All
Filter: Layer = 11 - Temeljne grede
Note: Longitudinal reinforcement is designed in the centre of the edges of the cross-section. Checks use the real position of the reinforcement.

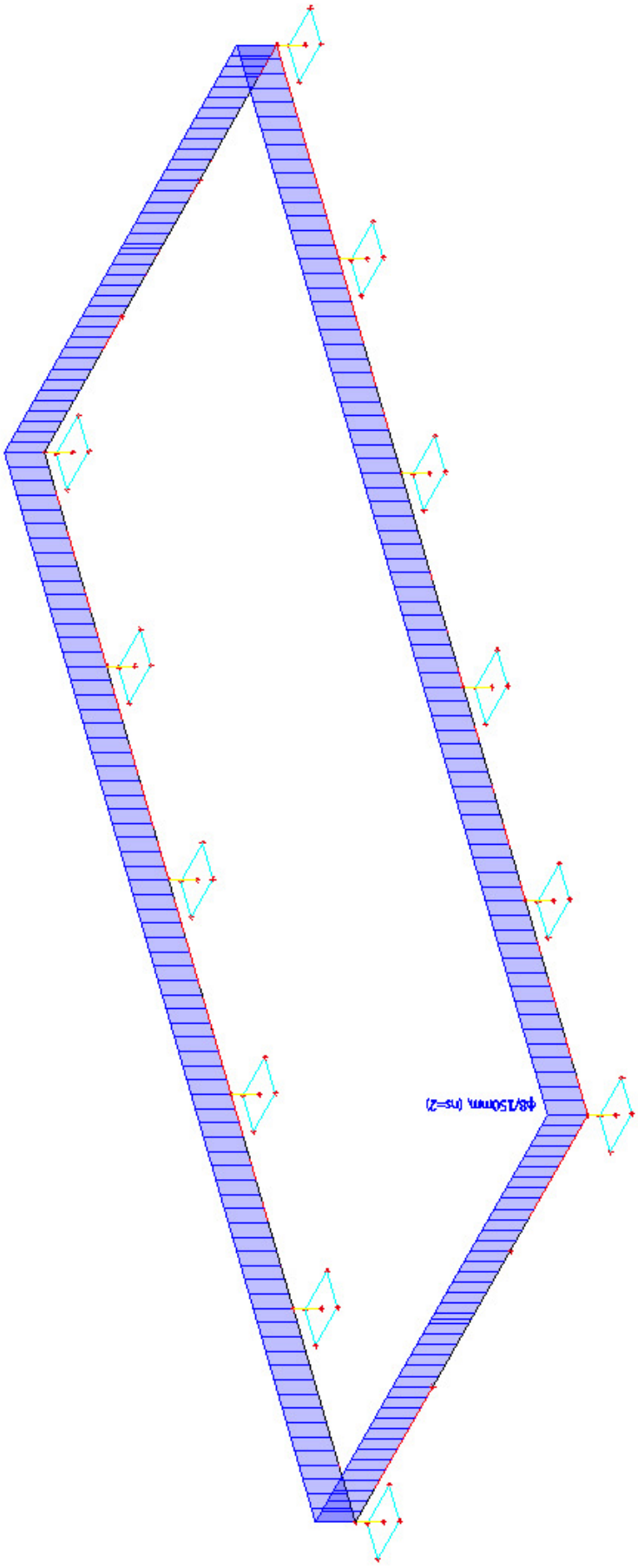


7.6. Potrebna poprečna armatura temeljnih greda



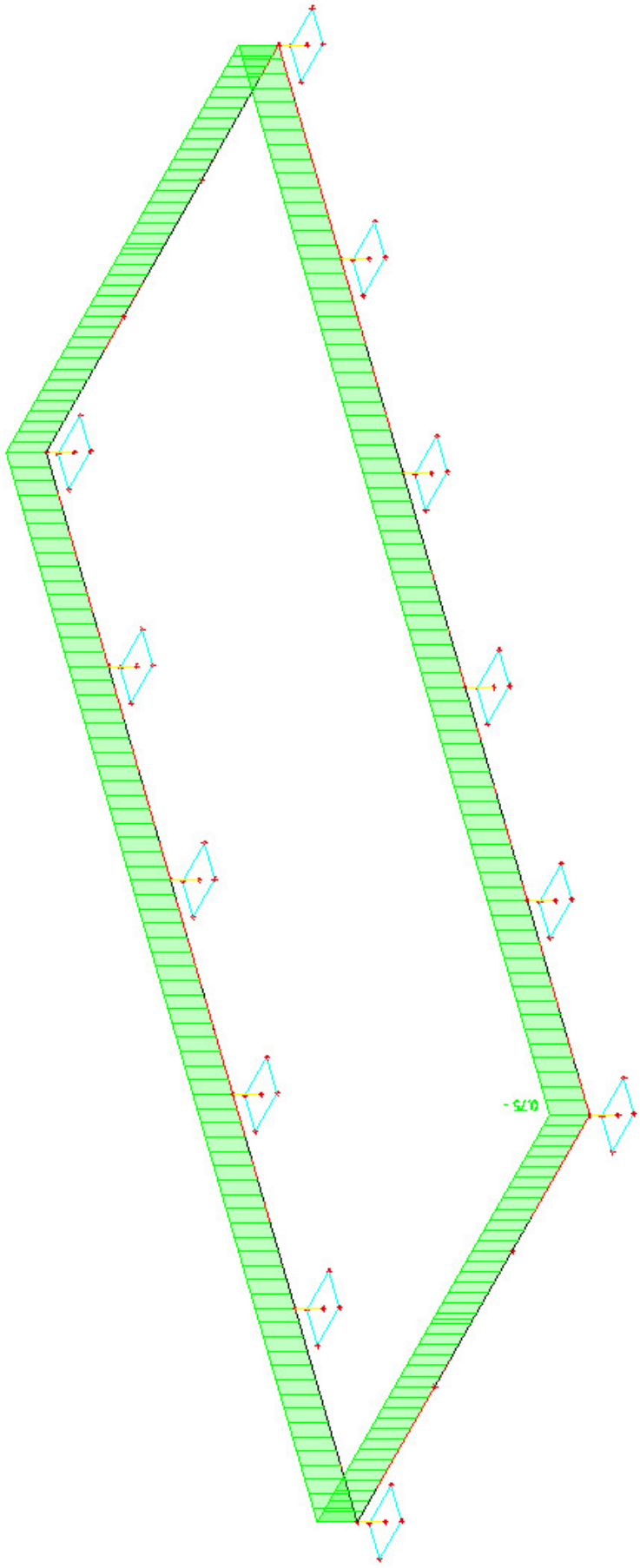
Values: $A_{swm\_req(\Phi)}$ /s)
Linear calculation
Class: All ULS
Coordinate system: Member
Extreme 1D: Global
Selection: All
Filter: Layer = 11 - Temeljne grede
Note: Longitudinal reinforcement is designed in the centre of the edges of the cross-section. Checks use the real position of the reinforcement.

7.7. Usvojena poprečna armatura temeljnih greda



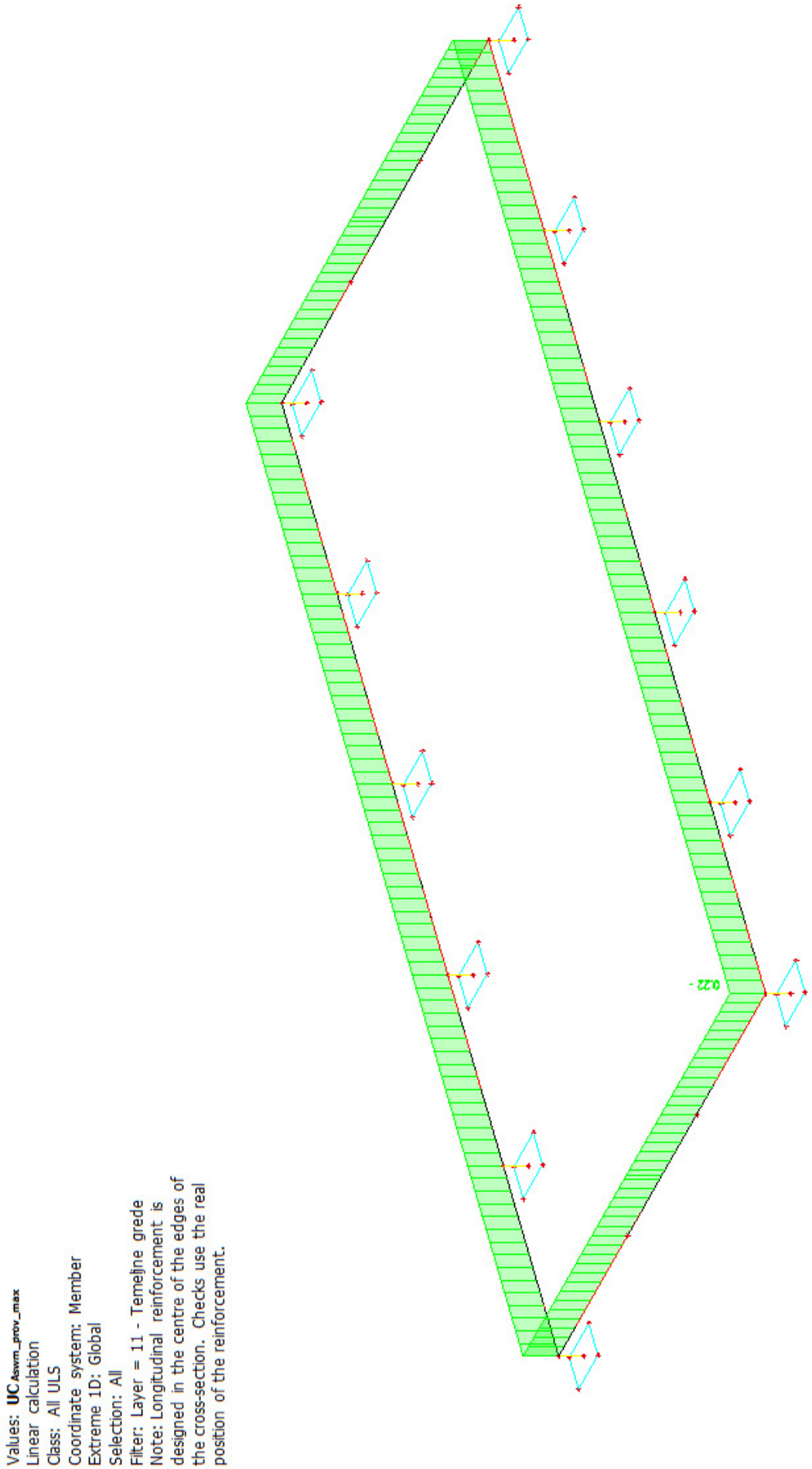
Values: $A_{swm\_prov(\Phi)}$ /s)
Linear calculation
Class: All ULS
Coordinate system: Member
Extreme 1D: Global
Selection: All
Filter: Layer = 11 - Temeljne grede
Note: Longitudinal reinforcement is designed in the centre of the edges of the cross-section. Checks use the real position of the reinforcement.

7.8. Ukupna provera poprečne armature temeljnih greda



Values: **UC** Aswm_req
Linear calculation
Class: All ULS
Coordinate system: Member
Extreme 1D: Global
Selection: All
Filter: Layer = 11 - Temeljne grede
Note: Longitudinal reinforcement is designed in the centre of the edges of the cross-section. Checks use the real position of the reinforcement.

7.9. Procenat poprečne armature temeljnih greda



7.10. Izveštaj armiranja temeljnih greda

Linearni proračun
Klasa: All ULS
Koordinatni sistem: Element
Ekstremni 1D: Globalni
Odabir: Svi
Filtar: Sloj = 11 - Temeljne grede\ nNapomena: Uzdužna armatura izvedena je u središtu rubova poprečnog presjeka. Provjere koriste stvarni položaj armature.

Greda B304	**Rectangle (50.00; 30.00)**
EC EN 1992-1-1:2004/AC:2008	Presjek 1 [dx = 0.41 m]

Dužina elementa	Ld = 5.33 m	**Materijali**	
Duljina izvijanja y	Ly = 16.8 m	Beton	C25/30
Duljina izvijanja z	Lz = 16 m	Armatura	B 500B

Uzdužna armatura

gornji: ϕ_{up} = 16 mm, c_{up} = 35 mm donji: ϕ_{lo} = 16 mm, c_{lo} = 35 mm

strana: c_{side} = 35 mm

Posmična armatura

$n_{s.req}$ = 2, $\phi_{s.req}$ = 8 mm, $\alpha_{s.req}$ = 90 °

Projektiraj posmičnu armaturu

Sadržaj kombinacije: 1.35*G+1.35*G1+1.50*W

V_{Ed} = 7.64 kN V_{Rdmax} = 592 kN V_{Rdc} = 60 kN T_{Ed} = 0 kNm T_{Rdc} = 19.3 kNm T_{Rdmax} = 71.2 kNm

Potrebna posmična armatura: **ϕ8/200 mm ($n_{s.req}$ = 2) => (A_{sw}/s_l) = 503 mm²/m**

Osigurana posmična armatura: **ϕ8/150 mm ($n_{s.prov}$ = 2) => (A_{sw}/s_l) = 670 mm²/m**

$A_{swm.req}$ [mm²/m]	$A_{swm.prov}$ [mm²/m]	$A_{swm.add.req}$ [mm²/m]	Provjera $A_{swm.prov} > A_{swm.req}$
503	670	0	DA (0.75)

Potrebno

Rub	y [m]	z [m]	$A_{s.stat}$ [mm²]	$A_{s.det.min}$ [mm²]	$A_{s.det.max}$ [mm²]	$\Delta A_{s.tor}$ [mm²]	$A_{s.req}$ [mm²]	$A_{s.req.bar}$ [mm²]	Armat.
1	0	-0.199	24.8	182	997	0	182	402	2ϕ16
2	0.099	0	0.02	89.3	2003	0	89.3	78.5	2ϕ10+1ϕ16
3	0	0.199	0	44.4	997	0	44.4	78.5	2ϕ10
4	-0.099	0	0.02	89.3	2003	0	89.3	157	2ϕ10+1ϕ16

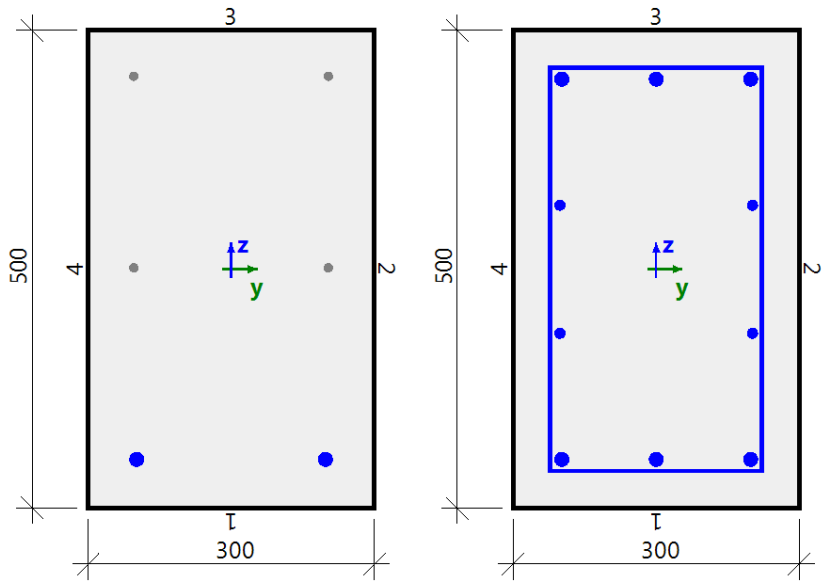
Osigurano

Rub	$A_{s.req}$ [mm²]	$A_{s.bas.prov}$ [mm²]	$A_{s.add.prov}$ [mm²]	$A_{s.det.prov}$ [mm²]	$A_{s.prov}$ [mm²]	$A_{s.add.req}$ [mm²]	Provjera $A_{s.prov} > A_{s.req}$	Armat. Osig.
1	182	603	0	0	603	0	DA (0.30)	3ϕ16
2	89.3	628	0	0	628	0	DA (0.14)	2ϕ12+2ϕ16
3	44.4	603	0	0	603	0	DA (0.07)	3ϕ16
4	89.3	628	0	0	628	0	DA (0.14)	2ϕ12+2ϕ16

Sažetak armature

Gornja strana :	$A_{sz.req+}$ = 44.43 mm²	$A_{sz.prov+}$ = 603.2 mm²
Donja strana:	$A_{sz.req-}$ = 181.7 mm²	$A_{sz.prov-}$ = 603.2 mm²
Desno :	$A_{sy.req+}$ = 89.31 mm²	$A_{sy.prov+}$ = 628.3 mm²
Lijevo :	$A_{sy.req-}$ = 89.31 mm²	$A_{sy.prov-}$ = 628.3 mm²
Ukupno vertikalno :	$A_{sz.req}$ = 226.1 mm²	$A_{sz.prov}$ = 1206 mm²
Ukupno horizontalno:	$A_{sy.req}$ = 178.6 mm²	$A_{sy.prov}$ = 1257 mm²
Ukupno :	$A_{s.req}$ = 404.7 mm²	$A_{s.prov}$ = 2463 mm²

Potrebne šipke **Osigurane šipke**



Greda B304	**Rectangle (50.00; 30.00)**
EC EN 1992-1-1:2004/AC:2008	Presjek 12 [dx = 4.92 m]

Dužina elementa	Ld = 5.33 m	**Materijali**	
Duljina izvijanja y	Ly = 16.8 m	Beton	C25/30
Duljina izvijanja z	Lz = 16 m	Armatura	B 500B

Uzdužna armatura

gornji: ϕ_{up} = 16 mm, c_{up} = 35 mm donji: ϕ_{lo} = 16 mm, c_{lo} = 35 mm

strana: c_{side} = 35 mm

Posmična armatura

$n_{s.req}$ = 2, $\phi_{s.req}$ = 8 mm, $\alpha_{s.req}$ = 90 °

Projektiraj posmičnu armaturu

Sadržaj kombinacije: 1.35*G+1.35*G1+1.50*S

V_{Ed} = 16.5 kN V_{Rdmax} = 585 kN V_{Rdc} = 50.6 kN T_{Ed} = 0 kNm T_{Rdc} = 19.3 kNm T_{Rdmax} = 71.3 kNm

Potrebna posmična armatura: **ϕ8/200 mm ($n_{s.req}$ = 2) => (A_{sw}/s_l) = 503 mm²/m**

Osigurana posmična armatura: **ϕ8/150 mm ($n_{s.prov}$ = 2) => (A_{sw}/s_l) = 670 mm²/m**

$A_{swm.req}$ [mm²/m]	$A_{swm.prov}$ [mm²/m]	$A_{swm.add.req}$ [mm²/m]	Provjera $A_{swm.prov} > A_{swm.req}$
503	670	0	DA (0.75)

$A_{s,z+}$: 1.35*G+1.35*G1+1.50*S : N_{Ed} = 1 kN, M_{Edy} = -25 kNm, M_{Edz} = 0 kNm

Potrebno

Rub	y [m]	z [m]	$A_{s.stat}$ [mm²]	$A_{s.det.min}$ [mm²]	$A_{s.det.max}$ [mm²]	$\Delta A_{s.tor}$ [mm²]	$A_{s.req}$ [mm²]	$A_{s.req.bar}$ [mm²]	Armat.
1	0	-0.199	0	44.4	997	0	44.4	78.5	2ϕ10
2	0.099	0	0.484	89.3	2003	0	89.3	157	2ϕ10+1ϕ16
3	0	0.199	125	180	997	0	180	402	2ϕ16
4	-0.099	0	0.484	89.3	2003	0	89.3	78.5	2ϕ10+1ϕ16

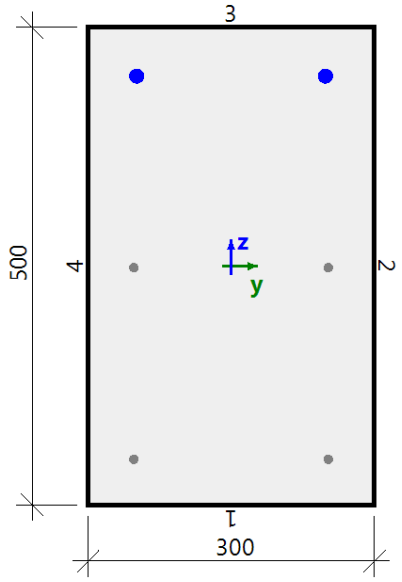
Osigurano

Rub	$A_{s.req}$ [mm^2]	$A_{s.bas.prov}$ [mm^2]	$A_{s.add.prov}$ [mm^2]	$A_{s.det.prov}$ [mm^2]	$A_{s.prov}$ [mm^2]	$A_{s.add.req}$ [mm^2]	Provjera $A_{s.prov} > A_{s.req}$	Armat. Osig.
1	44.4	603	0	0	603	0	DA (0.07)	3ϕ16
2	89.3	628	0	0	628	0	DA (0.14)	2ϕ12+2ϕ16
3	180	603	0	0	603	0	DA (0.30)	3ϕ16
4	89.3	628	0	0	628	0	DA (0.14)	2ϕ12+2ϕ16

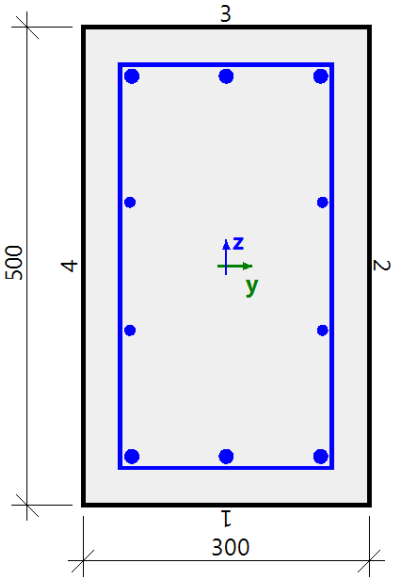
Sažetak armature

Gornja strana :	$A_{sz.req+} = 180.1\ mm^2$	$A_{sz.prov+} = 603.2\ mm^2$
Donja strana:	$A_{sz.req-} = 44.43\ mm^2$	$A_{sz.prov-} = 603.2\ mm^2$
Desno :	$A_{sy.req+} = 89.31\ mm^2$	$A_{sy.prov+} = 628.3\ mm^2$
Lijevo :	$A_{sy.req-} = 89.31\ mm^2$	$A_{sy.prov-} = 628.3\ mm^2$
Ukupno vertikalno :	$A_{sz.req} = 224.5\ mm^2$	$A_{sz.prov} = 1206\ mm^2$
Ukupno horizontalno:	$A_{sy.req} = 178.6\ mm^2$	$A_{sy.prov} = 1257\ mm^2$
Ukupno :	$A_{s.req} = 403.2\ mm^2$	$A_{s.prov} = 2463\ mm^2$

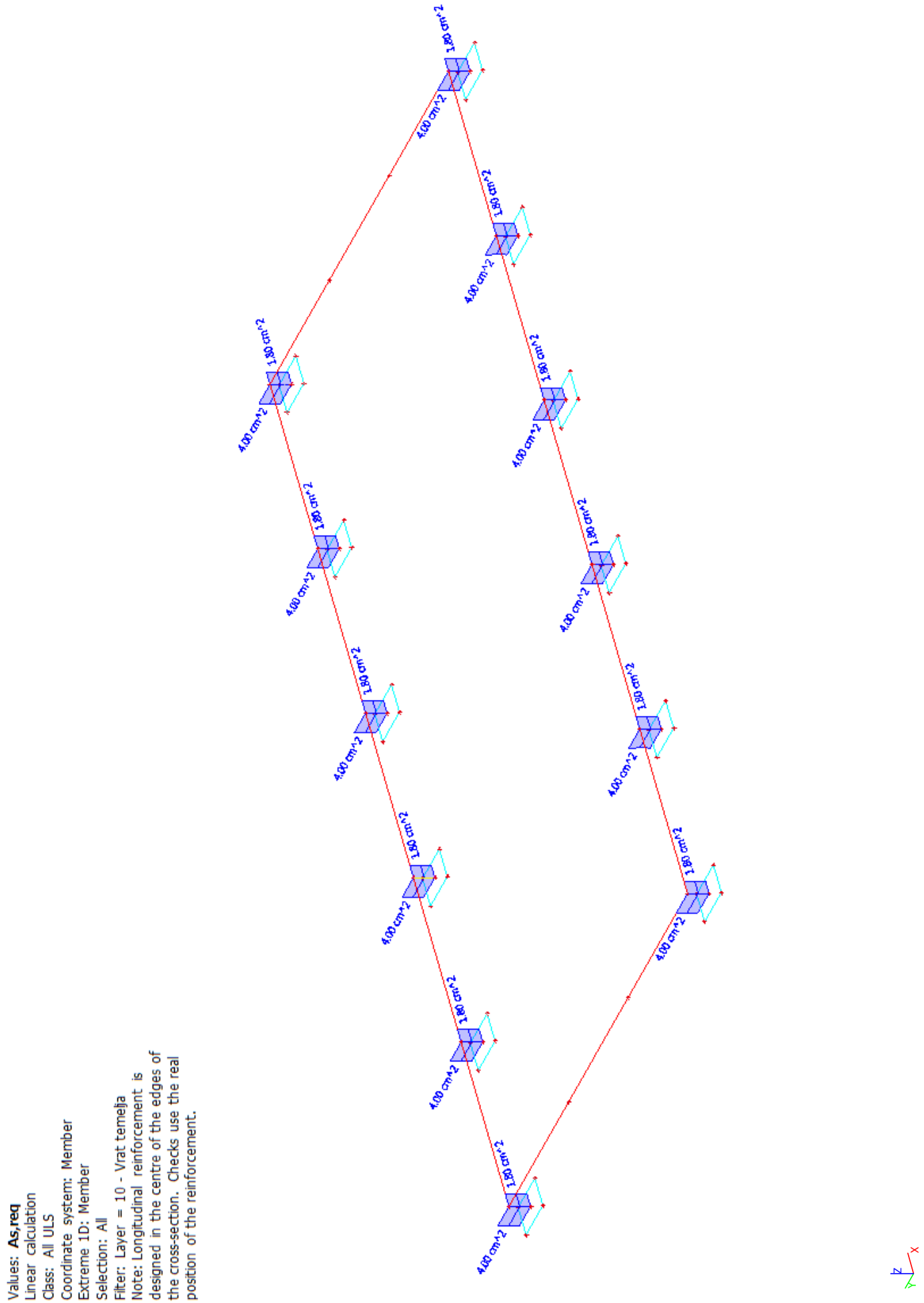
Potrebne šipke



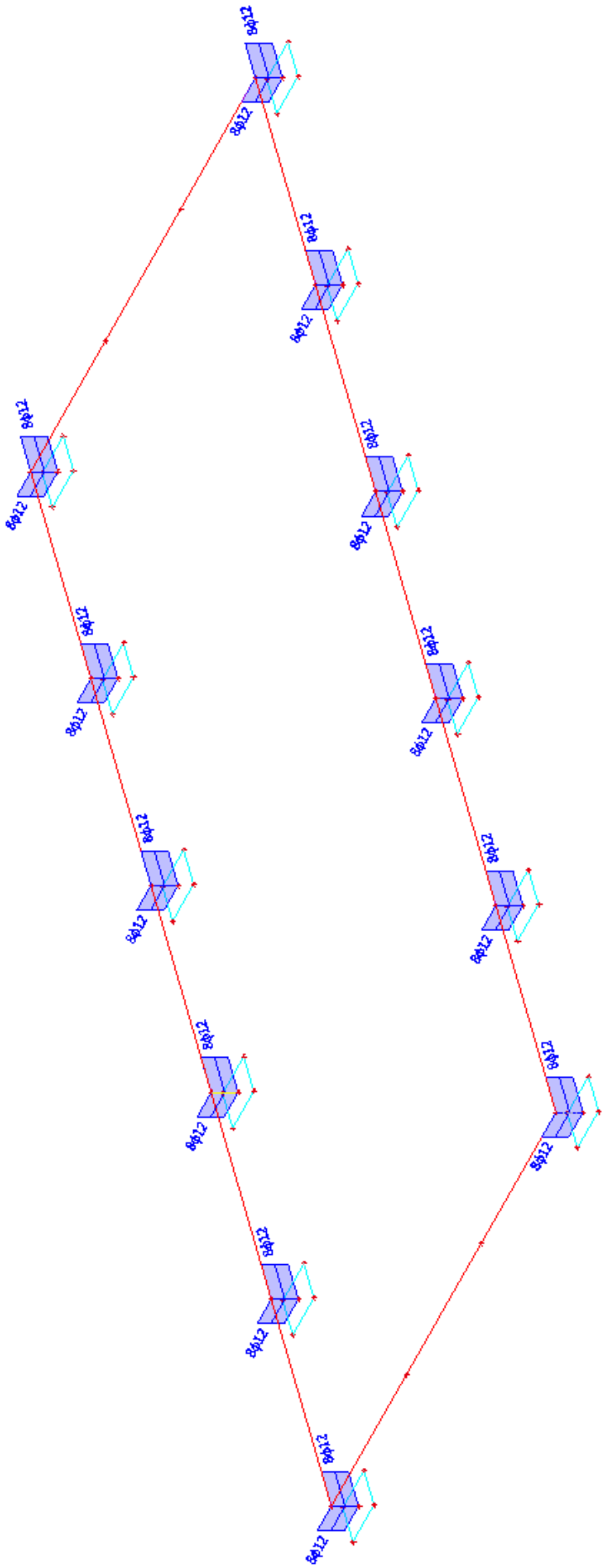
Osigurane šipke



7.11. Potrebna podužna armatura vrata temelja

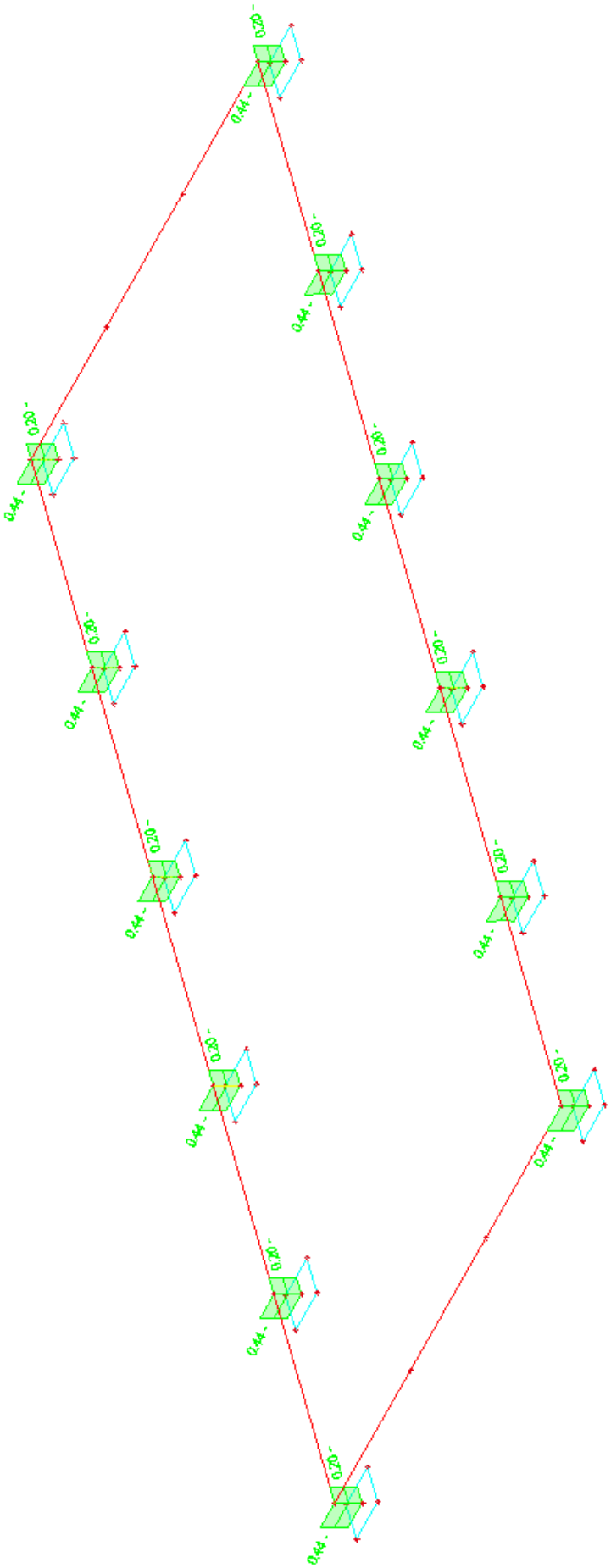


7.12. Usvojena podužna armatura vrata temelja



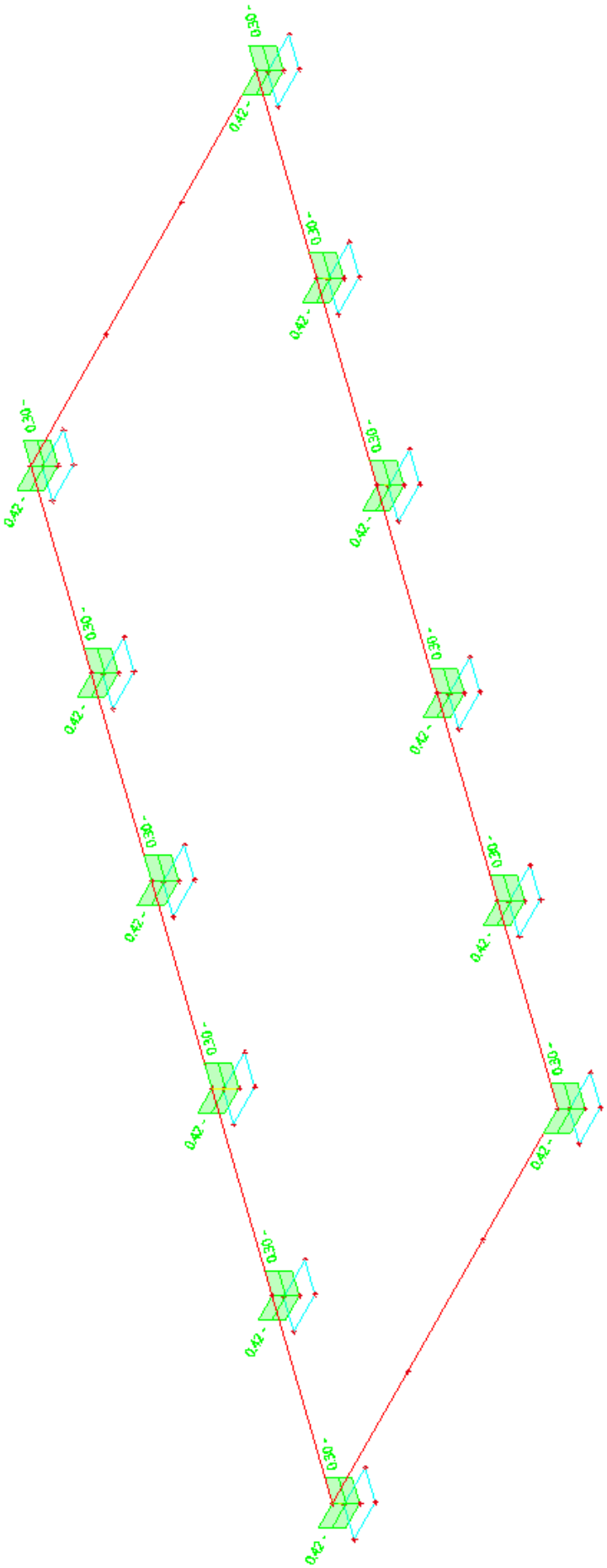
Values: **As,prov (ϕ)**
Linear calculation
Class: All ULS
Coordinate system: Member
Extreme 1D: Member
Selection: All
Filter: Layer = 10 - Vrat temelja
Note: Longitudinal reinforcement is designed in the centre of the edges of the cross-section. Checks use the real position of the reinforcement.

7.13. Ukupna provera podužne armature vrata temelja



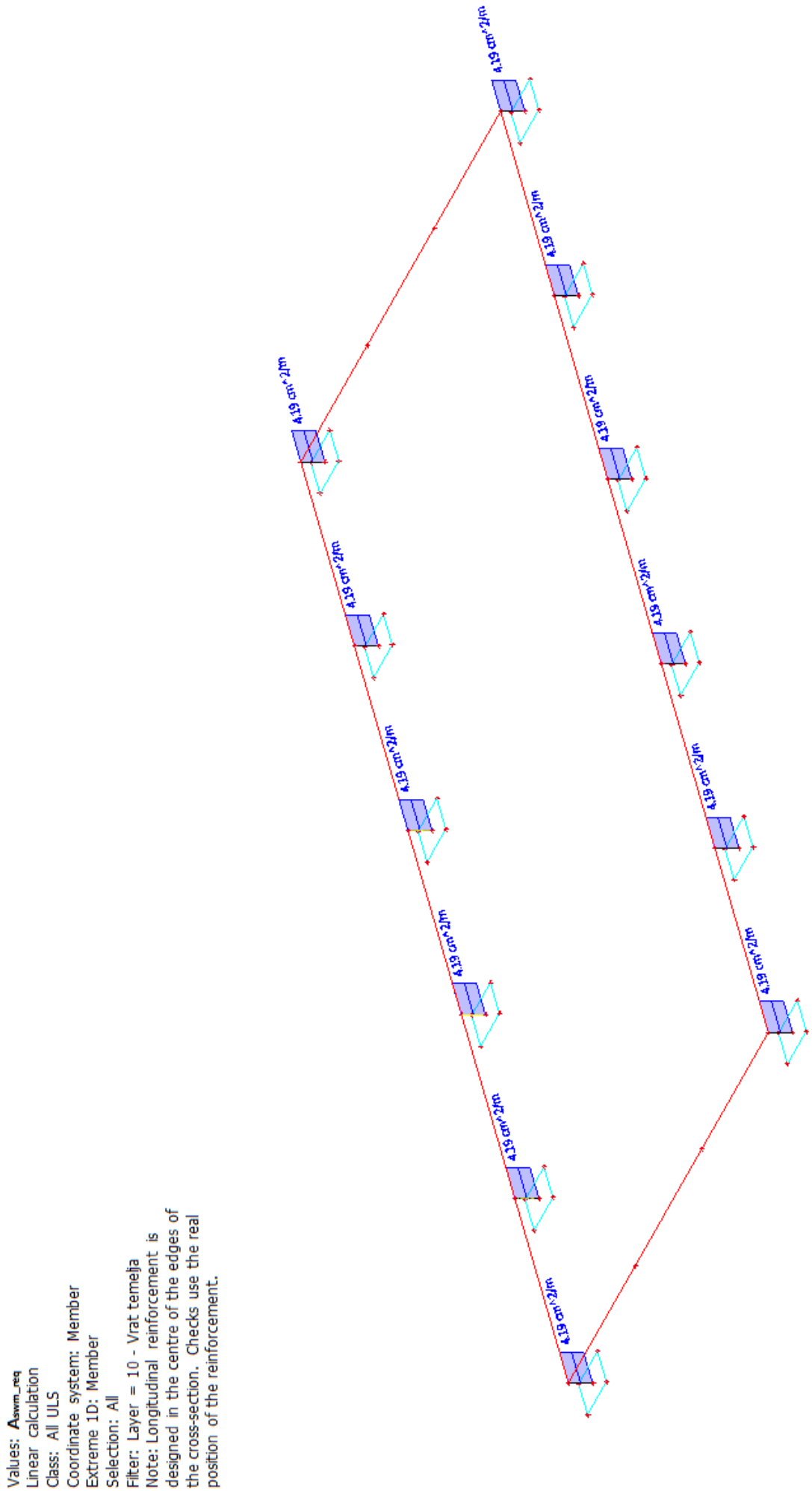
Values: **UC (As,req)**
Linear calculation
Class: All ULS
Coordinate system: Member
Extreme 1D: Member
Selection: All
Filter: Layer = 10 - Vrat temelja
Note: Longitudinal reinforcement is designed in the centre of the edges of the cross-section. Checks use the real position of the reinforcement.

7.14. Procenat usvojene podužne armature temeljnog vrata

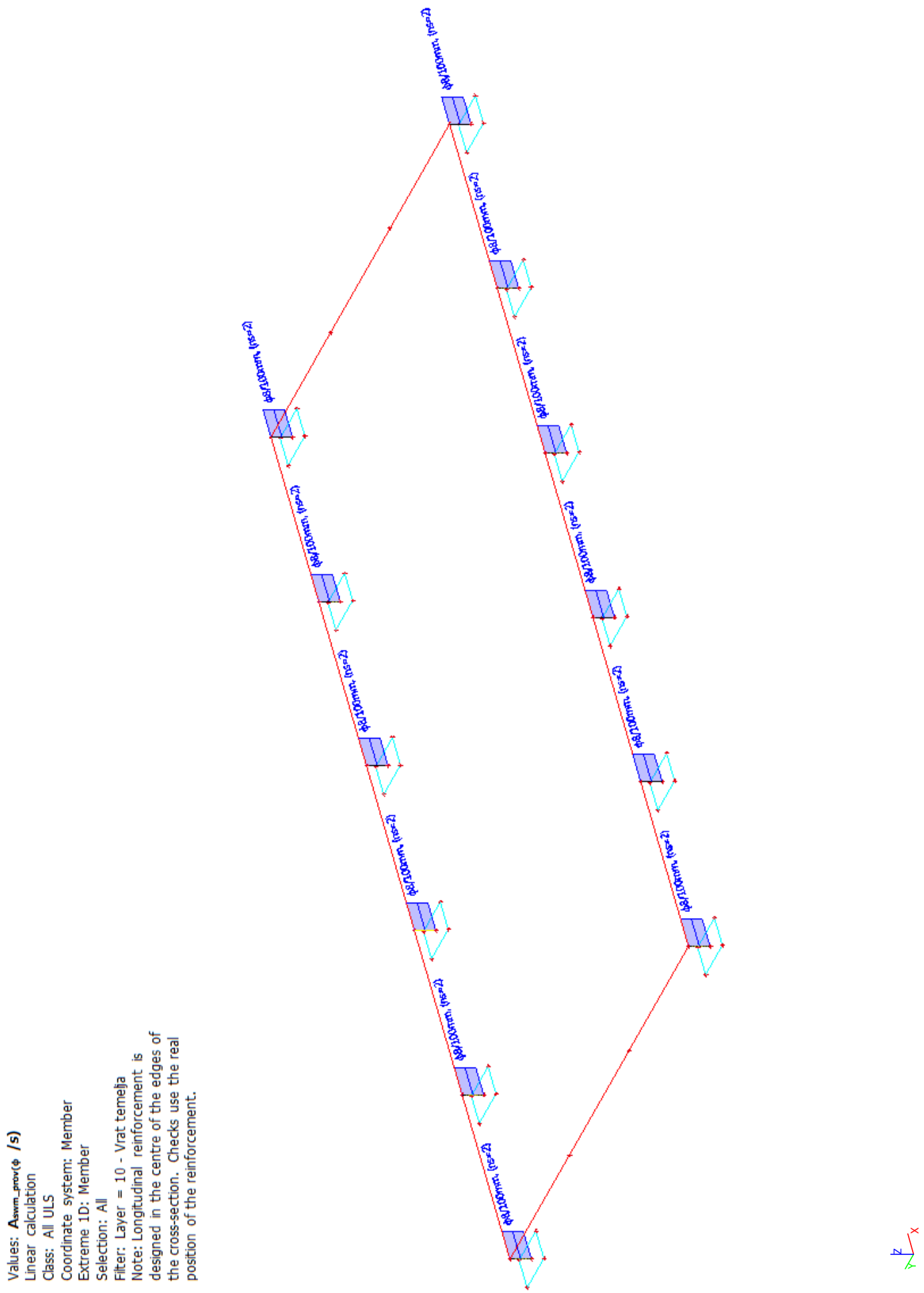


Values: **UC (As,max)**
Linear calculation
Class: All ULS
Coordinate system: Member
Extreme 1D: Member
Selection: All
Filter: Layer = 10 - Vrat temelja
Note: Longitudinal reinforcement is designed in the centre of the edges of the cross-section. Checks use the real position of the reinforcement.

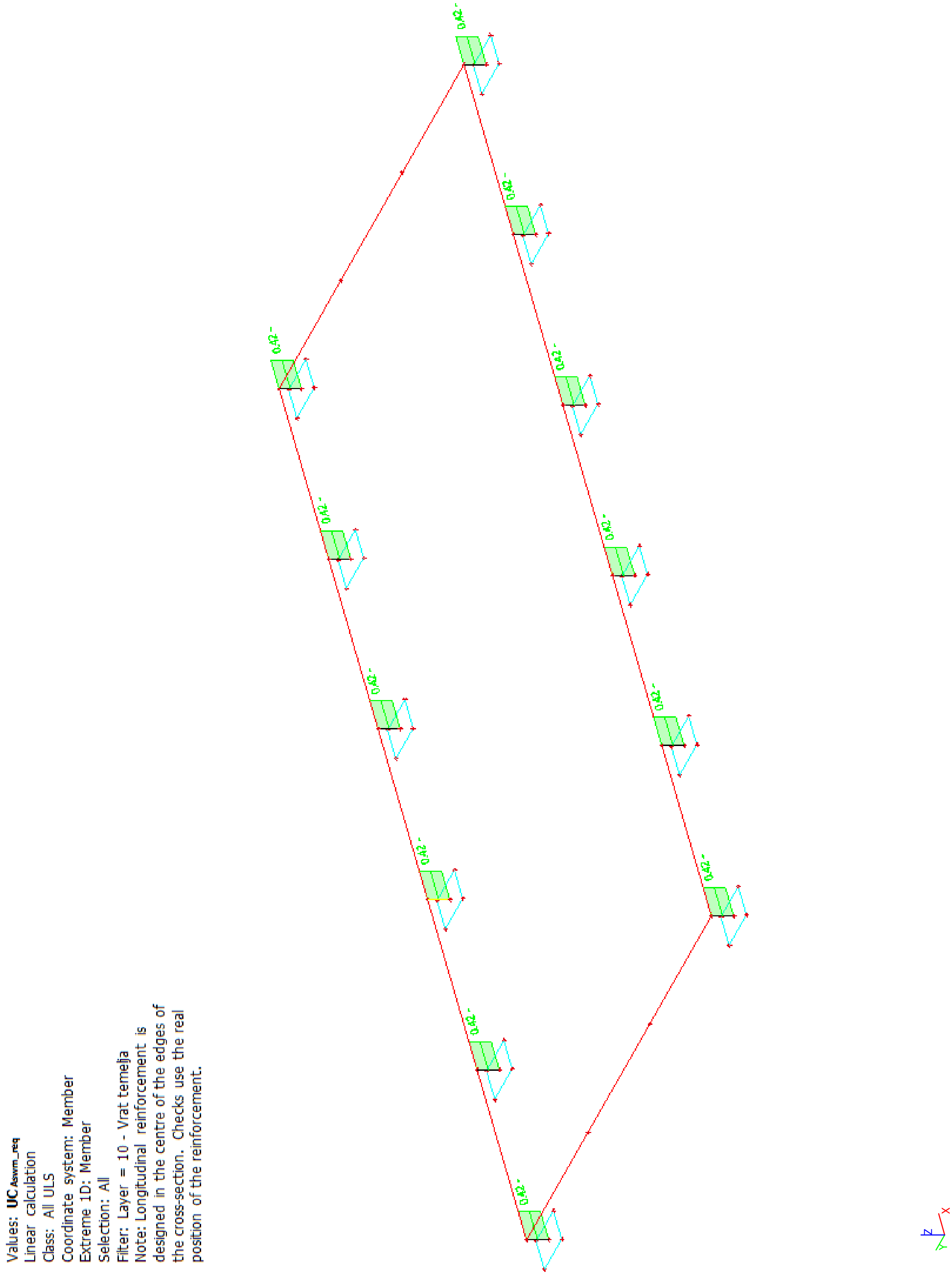
7.15. Potrebna poprečna armatura temeljnog vrata



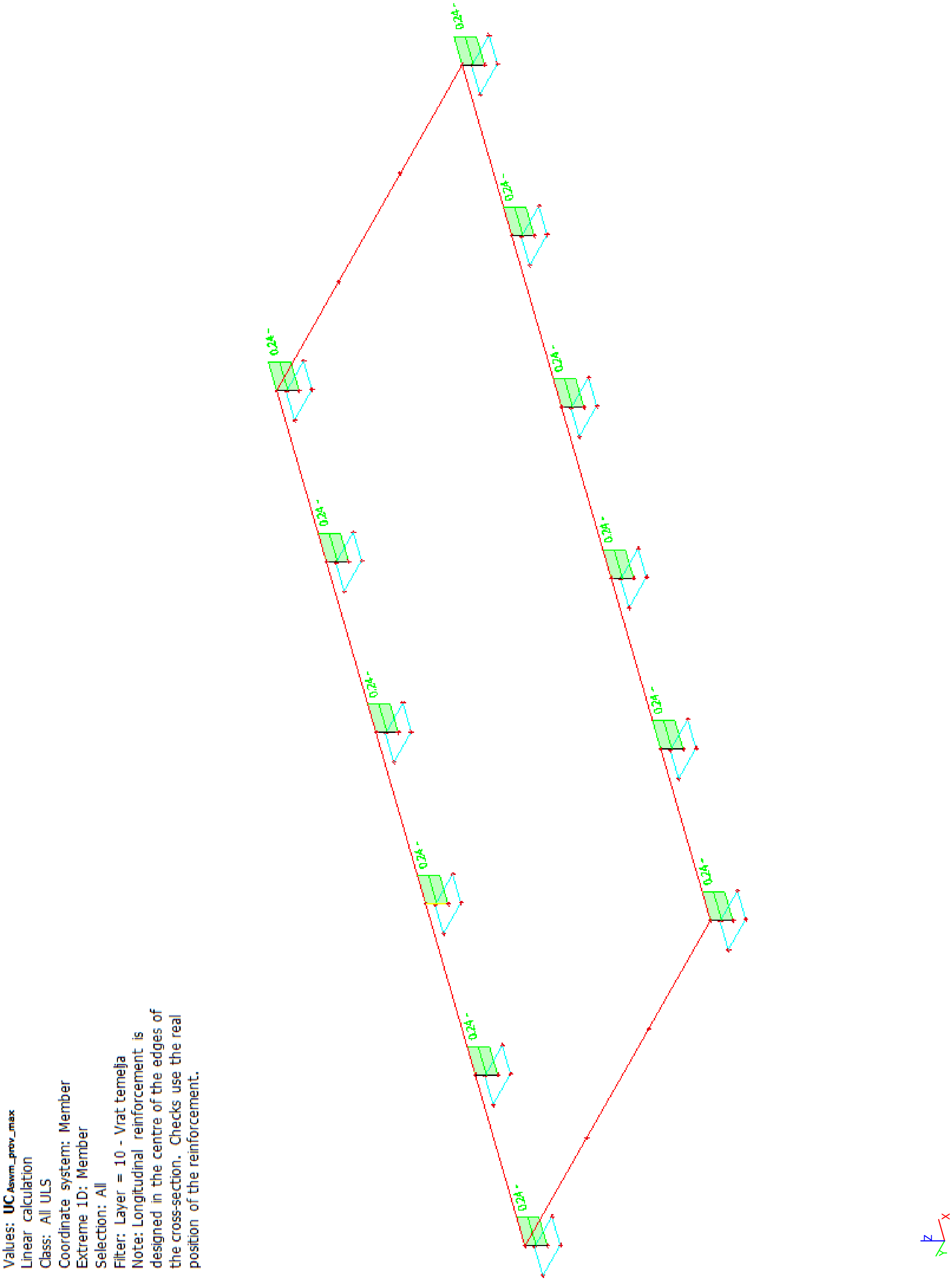
7.16. Usvojena poprečna armatura temeljnog vrata



7.17. Provera poprečne armature temeljnih vratova



7.18. Procenat usvojene poprečne armature temeljnih vratova



7.19. Izveštaj armiranja temeljnih vratova

Linearni proračun
Klasa: All ULS
Koordinatni sistem: Element
Ekstremni 1D: Globalni
Odabir: Svi
Filtar: Sloj = 10 - Vrat temelja\ nNapomena: Uzdužna armatura izvedena je u središtu rubova poprečnog presjeka. Provjere koriste stvarni položaj armature.

Stup B283	**Rectangle (40.00; 50.00)**
EC EN 1992-1-1:2004/AC:2008	Presjek 1 [dx = 0.35 m]

Dužina elementa	Ld = 0.7 m	**Materijali**	
Duljina izvijanja y	Ly = 7 m	Beton	C25/30
Duljina izvijanja z	Lz = 7 m	Armatura	B 500B

Uzdužna armatura

ϕ = 12 mm, c = 35 mm,

Posmična armatura

$n_{s.req}$ = 2, $\phi_{s.req}$ = 8 mm, $\alpha_{s.req}$ = 90 °

Projektiraj posmičnu armaturu

Sadržaj kombinacije: 1.35*G+1.35*G1+0.75*SL+1.50*WmaxD

V_{Ed} = 4.83 kN V_{Rdmax} = 725 kN V_{Rdc} = 112 kN T_{Ed} = 155·10^{-6} kNm T_{Rdc} = 30 kNm T_{Rdmax} = 111 kNm

Potrebna posmična armatura: **ϕ8/240 mm ($n_{s.req}$ = 2) => (A_{sw}/s_l) = 419 mm^2/m**

Osigurana posmična armatura: **ϕ8/100 mm ($n_{s.prov}$ = 2) => (A_{sw}/s_l) = 1005 mm^2/m**

$A_{swm.req}$ [mm^2/m]	$A_{swm.prov}$ [mm^2/m]	$A_{swm.add.req}$ [mm^2/m]	Provjera $A_{swm.prov} > A_{swm.req}$
419	1005	0	DA (0.42)

$A_{s.z+}$: G+G1+1.50*WmaxD : N_{Ed} = 5 kN, M_{Edy} = 0 kNm, M_{Edz} = -10 kNm
$A_{s.z-}$: G+G1+1.50*WmaxD : N_{Ed} = 5 kN, M_{Edy} = 0 kNm, M_{Edz} = -10 kNm
$A_{s.y+}$: G+G1+1.50*WmaxD : N_{Ed} = 5 kN, M_{Edy} = 0 kNm, M_{Edz} = -10 kNm
$A_{s.y-}$: G+G1+1.50*WmaxD : N_{Ed} = 5 kN, M_{Edy} = 0 kNm, M_{Edz} = -10 kNm

Potrebno

Rub	y [m]	z [m]	$A_{s.stat}$ [mm^2]	$A_{s.det.min}$ [mm^2]	$A_{s.det.max}$ [mm^2]	$\Delta A_{s.tor}$ [mm^2]	$A_{s.req}$ [mm^2]	$A_{s.req.bar}$ [mm^2]	Armat.
1	0	-0.151	2.59	90.2	2284	0	90.2	192	1ϕ10+2ϕ12
2	0.201	0	55.6	191	1716	0	191	226	3ϕ12
3	0	0.151	2.59	90.2	2284	0	90.2	192	1ϕ10+2ϕ12
4	-0.201	0	55.6	191	1716	0	191	226	3ϕ12

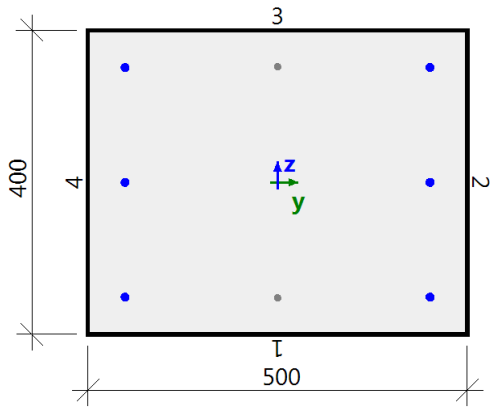
Osigurano

Rub	$A_{s.req}$ [mm^2]	$A_{s.bas.prov}$ [mm^2]	$A_{s.add.prov}$ [mm^2]	$A_{s.det.prov}$ [mm^2]	$A_{s.prov}$ [mm^2]	$A_{s.add.req}$ [mm^2]	Provjera $A_{s.prov} > A_{s.req}$	Armat. Osig.
1	90.2	452	0	0	452	0	DA (0.20)	4ϕ12
2	191	452	0	0	452	0	DA (0.42)	4ϕ12
3	90.2	452	0	0	452	0	DA (0.20)	4ϕ12
4	191	452	0	0	452	0	DA (0.42)	4ϕ12

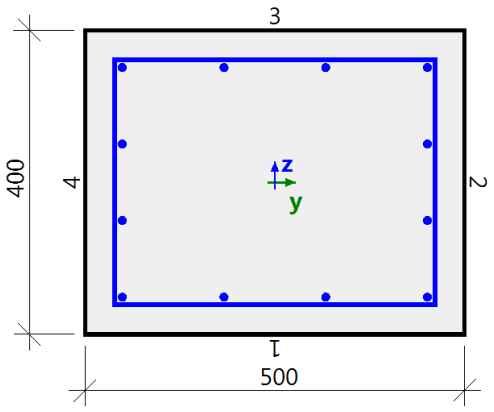
Sažetak armature

Rub Y	$A_{sz.req}$ = 180.4 mm^2	$A_{sz.prov}$ = 904.8 mm^2
Rub Z	$A_{sy.req}$ = 382.2 mm^2	$A_{sy.prov}$ = 904.8 mm^2
Ukupno :	$A_{s.req}$ = 562.6 mm^2	$A_{s.prov}$ = 1810 mm^2

Potrebne šipke



Osigurane šipke



Stup B282	**Rectangle (40.00; 50.00)**
EC EN 1992-1-1:2004/AC:2008	Presjek 0 [dx = 0 m]

Dužina elementa	Ld = 0.7 m	**Materijali**	
Duljina izvijanja y	Ly = 7 m	Beton	C25/30
Duljina izvijanja z	Lz = 7 m	Armatura	B 500B

Uzdužna armatura

ϕ = 12 mm, c = 35 mm,

Posmična armatura

$n_{s.req}$ = 2, $\phi_{s.req}$ = 8 mm, $\alpha_{s.req}$ = 90 °

Projektiraj posmičnu armaturu

Sadržaj kombinacije: 1.35*G+1.35*G1+0.75*SL+1.50*WmaxL

V_{Ed} = 4.52 kN V_{Rdmax} = 690 kN V_{Rdc} = 127 kN T_{Ed} = 41.9·10^{-6} kNm T_{Rdc} = 30 kNm T_{Rdmax} = 111 kNm

Potrebna posmična armatura: **ϕ8/240 mm ($n_{s.req}$ = 2) => (A_{sw}/s_l) = 419 mm^2/m**

Osigurana posmična armatura: **ϕ8/100 mm ($n_{s.prov}$ = 2) => (A_{sw}/s_l) = 1005 mm^2/m**

$A_{swm.req}$ [mm^2/m]	$A_{swm.prov}$ [mm^2/m]	$A_{swm.add.req}$ [mm^2/m]	Provjera $A_{swm.prov} > A_{swm.req}$
419	1005	0	DA (0.42)

Potrebno

Rub	y [m]	z [m]	$A_{s.stat}$ [mm^2]	$A_{s.det.min}$ [mm^2]	$A_{s.det.max}$ [mm^2]	$\Delta A_{s.tor}$ [mm^2]	$A_{s.req}$ [mm^2]	$A_{s.req.bar}$ [mm^2]	Armat.
1	0	-0.151	0	90.2	2284	0	90.2	78.5	1ϕ10+2ϕ12
2	0.201	0	33.1	200	1716	0	200	226	2ϕ12
3	0	0.151	0	90.2	2284	0	90.2	78.5	1ϕ10+2ϕ12
4	-0.201	0	33.1	200	1716	0	200	226	2ϕ12

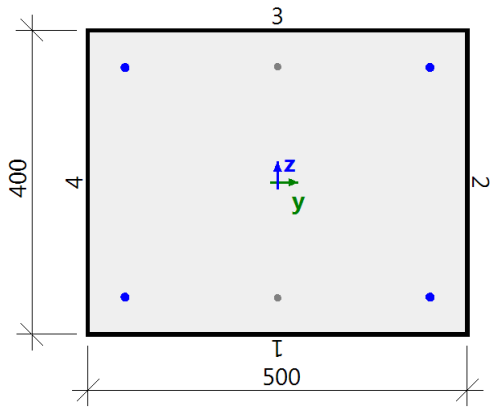
Osigurano

Rub	$A_{s.req}$ [mm^2]	$A_{s.bas.prov}$ [mm^2]	$A_{s.add.prov}$ [mm^2]	$A_{s.det.prov}$ [mm^2]	$A_{s.prov}$ [mm^2]	$A_{s.add.req}$ [mm^2]	Provjera $A_{s.prov} > A_{s.req}$	Armat. Osig.
1	90.2	452	0	0	452	0	DA (0.20)	4ϕ12
2	200	452	0	0	452	0	DA (0.44)	4ϕ12
3	90.2	452	0	0	452	0	DA (0.20)	4ϕ12
4	200	452	0	0	452	0	DA (0.44)	4ϕ12

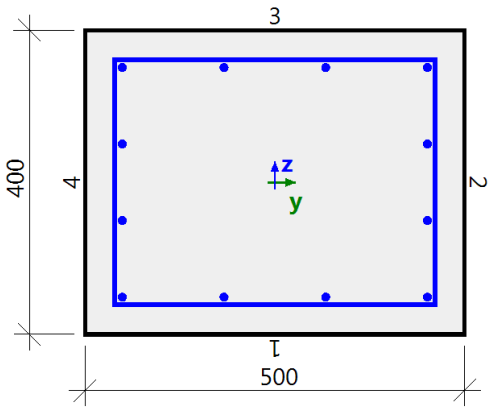
Sažetak armature

Rub Y	$A_{sz.req}$ = 180.4 mm^2	$A_{sz.prov}$ = 904.8 mm^2
Rub Z	$A_{sy.req}$ = 400 mm^2	$A_{sy.prov}$ = 904.8 mm^2
Ukupno :	$A_{s.req}$ = 580.4 mm^2	$A_{s.prov}$ = 1810 mm^2

Potrebne šipke

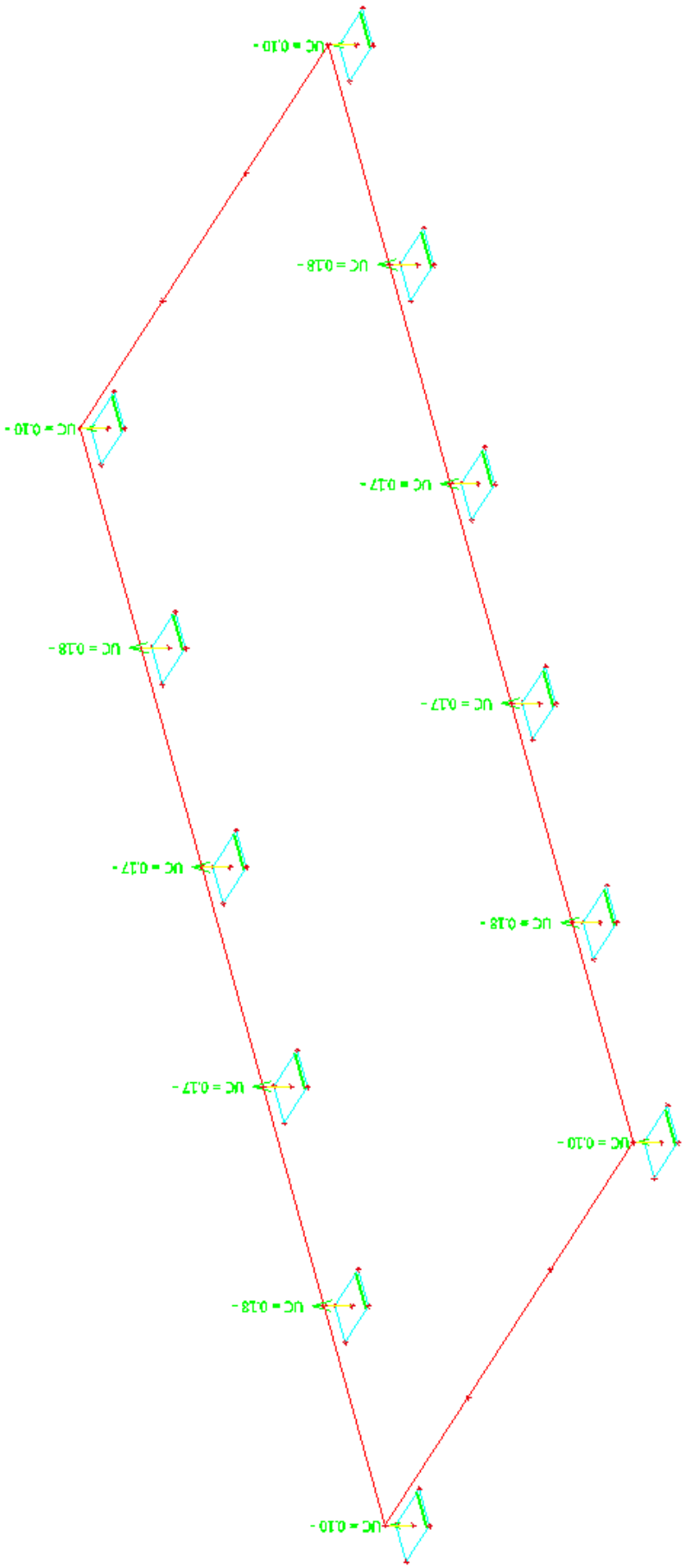


Osigurane šipke



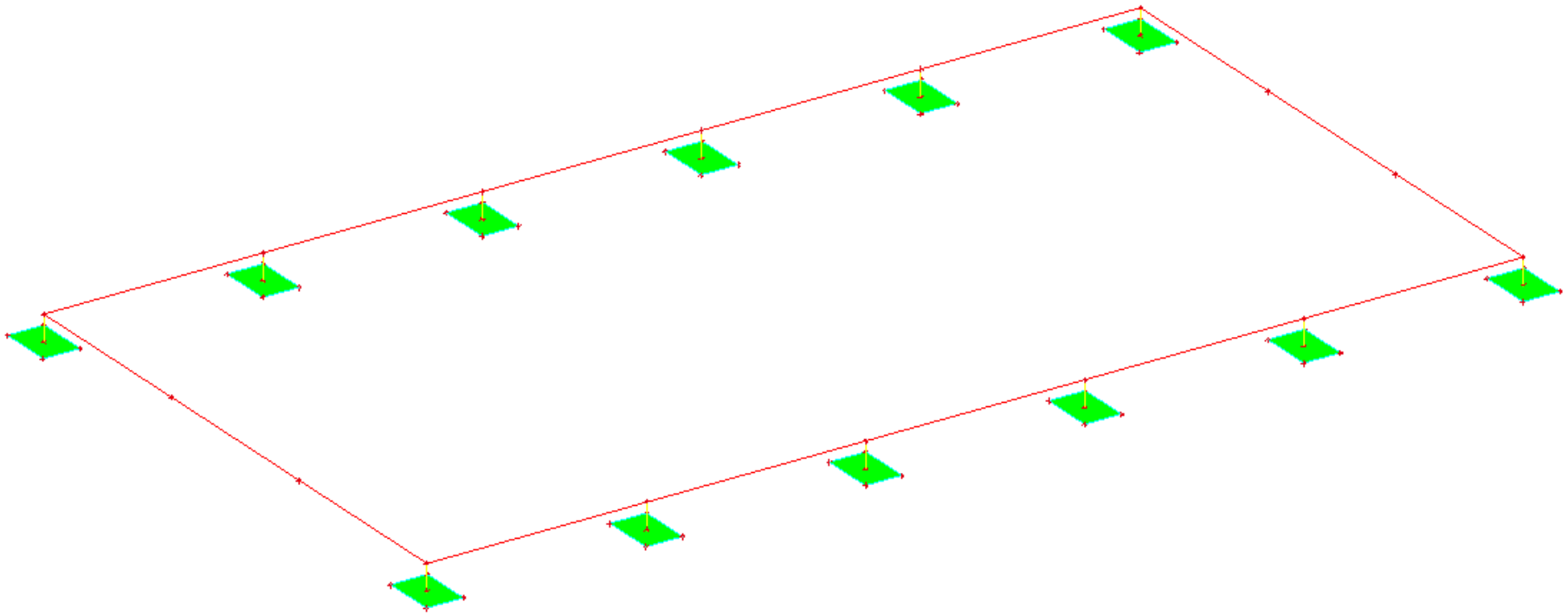
8. Temeljne stope

8.1. Kontrola proboja temeljnih stopa



Values: **UC**
Linear calculation
Class: All ULS
Extreme: Node
Selection: All

Values: $A_{s,req,1}$-
Linear calculation
Class: All ULS
Extreme: Global
Selection: All
Filter: Layer = 12 - Stopa temelja
Location: In nodes avg. on macro.
Rotation of the planar system:
LCS-Member 2D

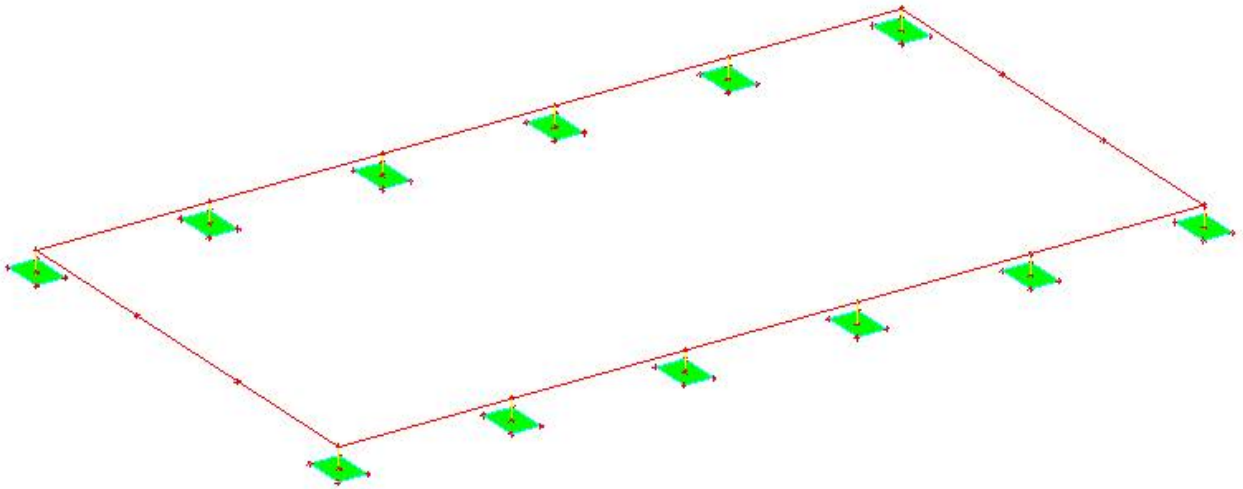


Constant value 4.92
$A_{s,req,1}$-[cm²/m]

8.2. Potrebna armatura temeljne stope (ULS+SLS); As,req,1-

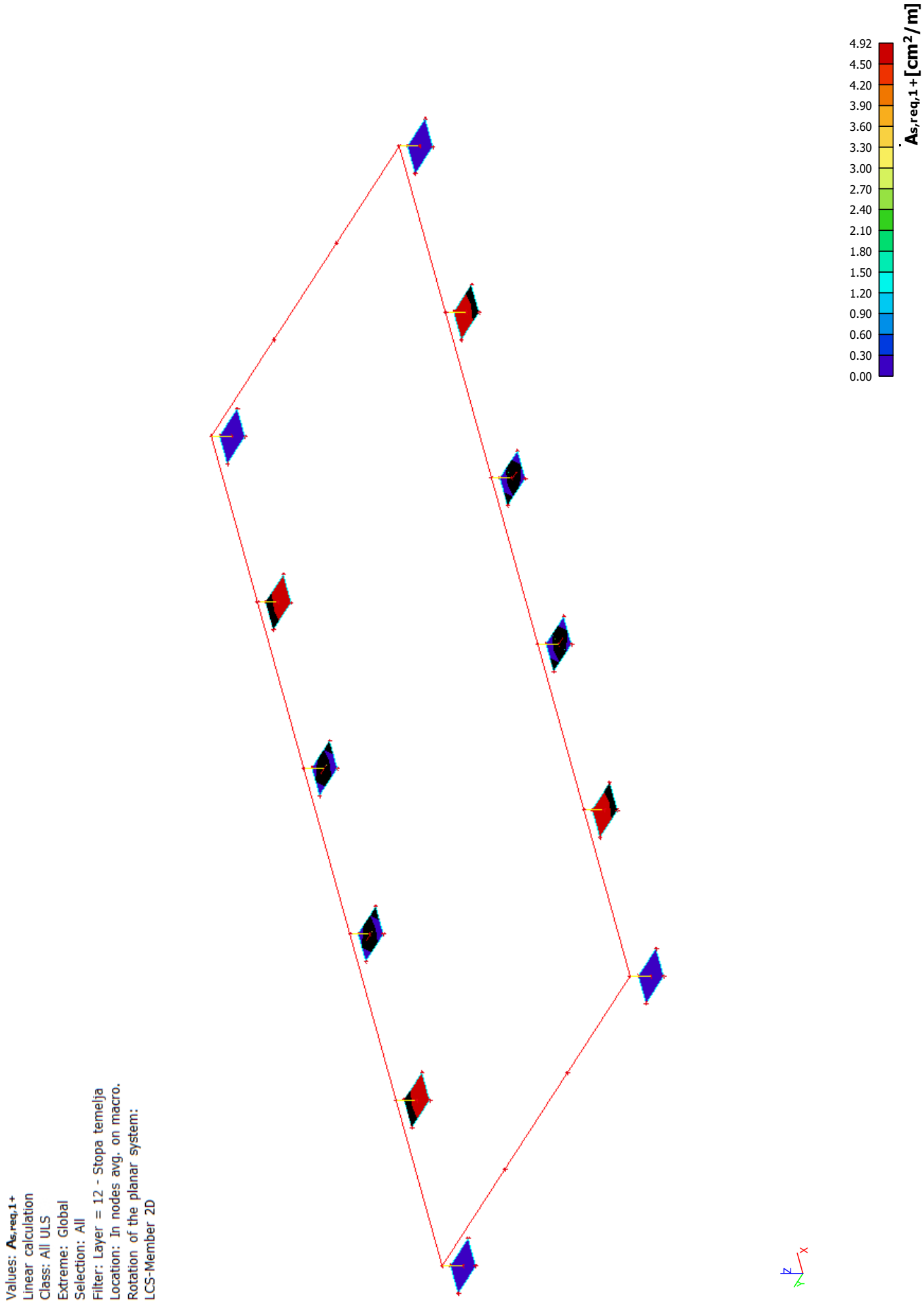
8.3. Potrebna armatura temeljne stope (ULS+SLS); As,req,2-

Values: $A_{s,req,2-}$
Linear calculation
Class: All ULS
Extreme: Global
Selection: All
Filter: Layer = 12 - Stopa temelja
Location: In nodes avg. on macro.
Rotation of the planar system:
LCS-Member 2D

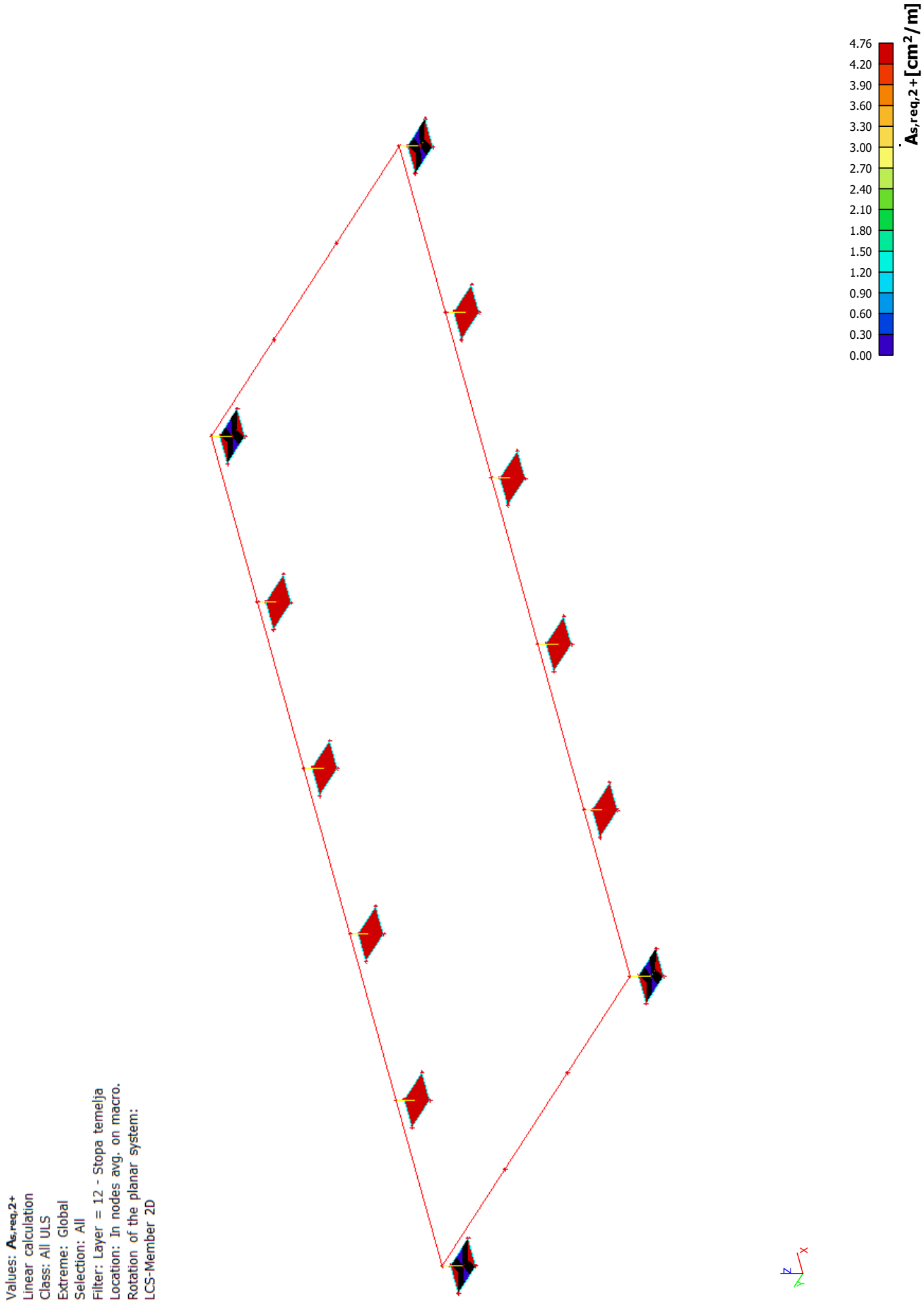


Constant value 4.76
$A_{s,req,2-}$ [cm²/m]

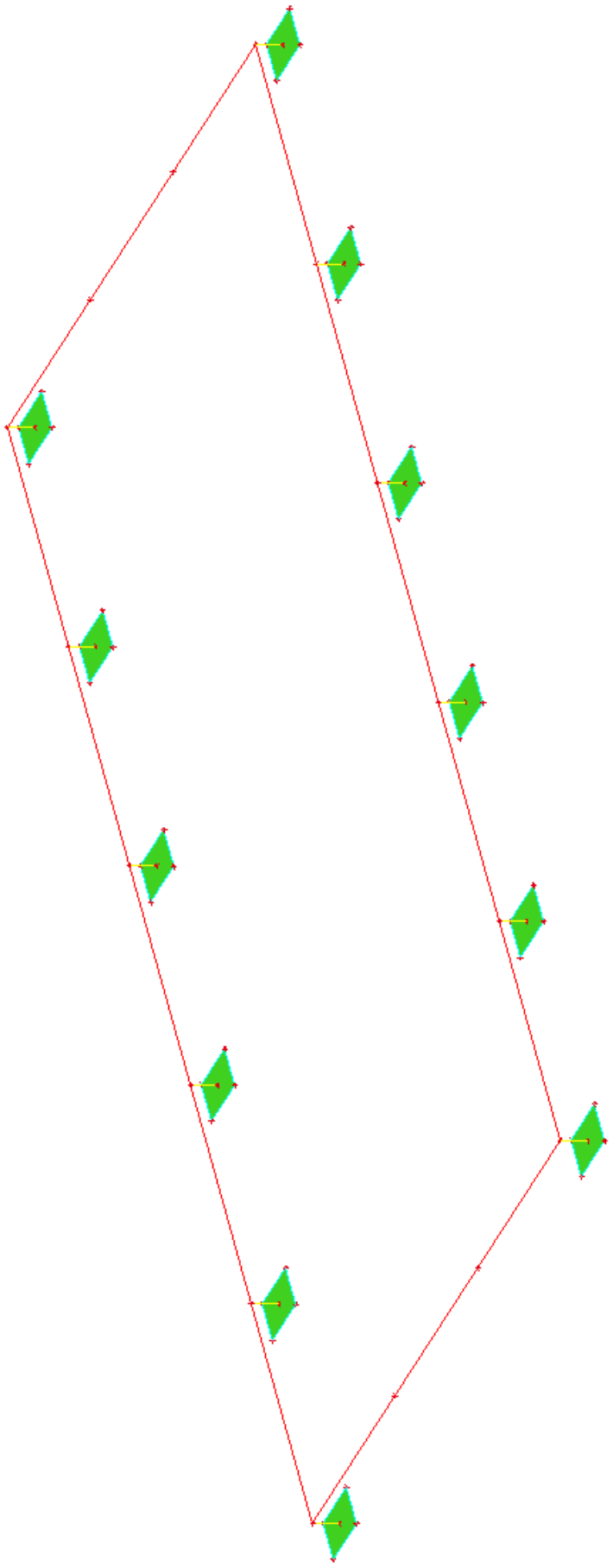
8.4. Potrebna armatura temeljne stope (ULS+SLS); As,req,1+



8.5. Potrebna armatura temeljne stope (ULS+SLS); As,req,2+



8.6. Usvojena armatura temeljne stope (ULS+SLS); As,prov,1-

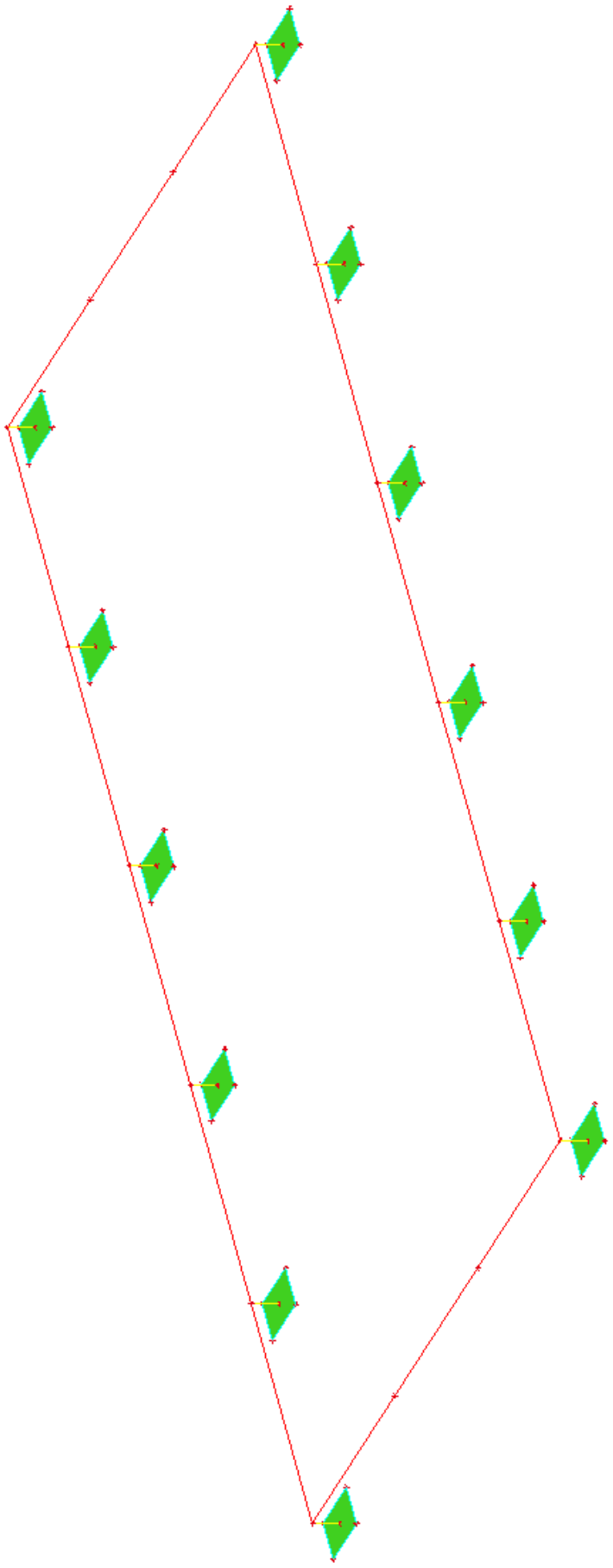


Values: **Reinf** Prov,1-
Linear calculation
Class: All ULS
Extreme: Global
Selection: All
Filter: Layer = 12 - Stopa temelja
Location: In nodes avg. on macro.
Rotation of the planar system:
LCS-Member 2D

Reinf Prov,1-

ϕ12/150

8.7. Usvojena armatura temeljne stope (ULS+SLS); As,prov,2-

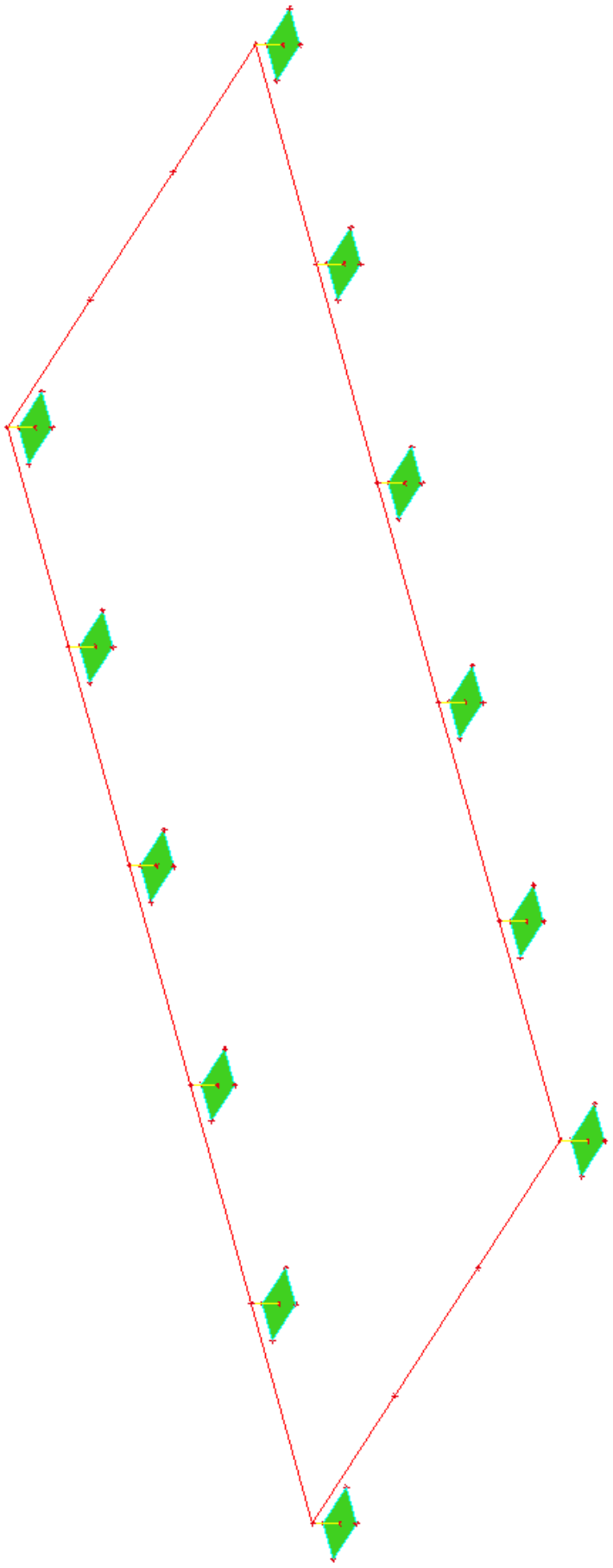


Values: **Reinf** Prov,2-
Linear calculation
Class: All ULS
Extreme: Global
Selection: All
Filter: Layer = 12 - Stopa temelja
Location: In nodes avg. on macro.
Rotation of the planar system:
LCS-Member 2D

Reinf Prov,2-

ϕ12/150

8.8. Usvojena armatura temeljne stope (ULS+SLS); As,prov,1+

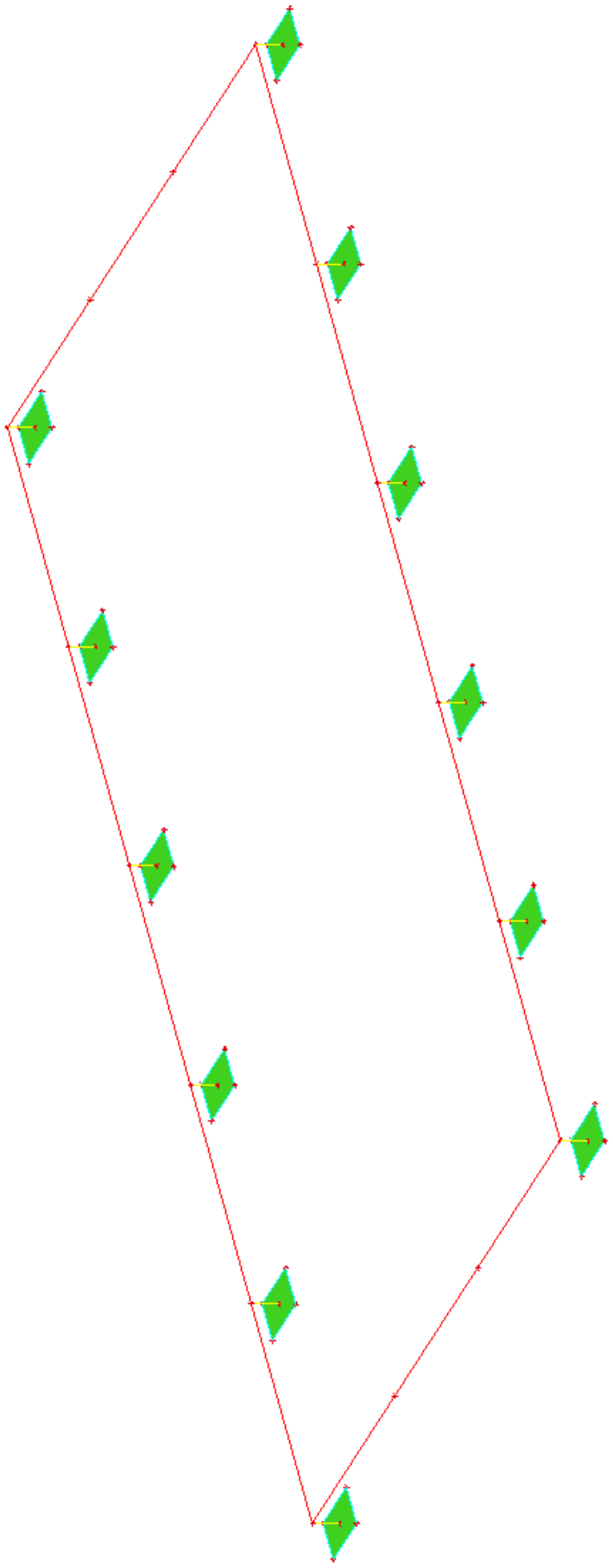


Values: **Reinf** Prov,1+
Linear calculation
Class: All ULS
Extreme: Global
Selection: All
Filter: Layer = 12 - Stopa temelja
Location: In nodes avg. on macro.
Rotation of the planar system:
LCS-Member 2D

Reinf Prov,1+

ϕ12/150

8.9. Usvojena armatura temeljne stope (ULS+SLS); As,prov,2+



Values: **Reinf** Prov,2+
Linear calculation
Class: All ULS
Extreme: Global
Selection: All
Filter: Layer = 12 - Stopa temelja
Location: In nodes avg. on macro.
Rotation of the planar system:
LCS-Member 2D

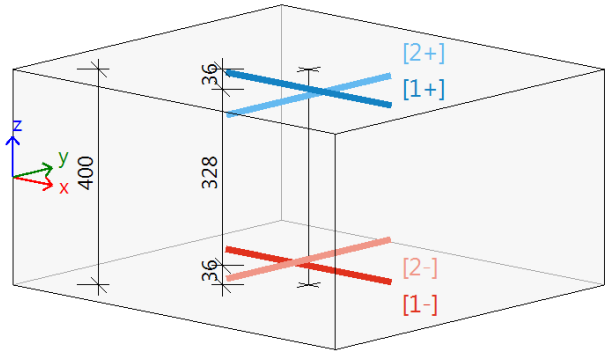
Reinf Prov,2+

ϕ12/150

8.10. Izveštaj armiranja temeljnih stopa

Linearni proračun
Klasa: All ULS
Ekstrem: Globalni
Odabir: Svi
Filtar: Sloj = 12 - Stopa temelja
Položaj: U čvorova prosj. na makro. Sustav: Element mreže LCS

Ploča S5	**h=400 mm**
EC EN 1992-1-1:2004/AC:2008	Čvor 490/8 [X= 24.000, Y=2.394, Z=-0.700 m]



Beton: C25/30
Dvosmjerni dijagram naprezanja i deformacije
Razred izloženosti: XC3
Zaštitni sloj 30 mm

Armatura: B 500B
Dvosmjerni s nagnutim vrhom grana
[1+] ϕ12/150
[2+] ϕ12/150
[1-] ϕ12/150
[2-] ϕ12/150

Projektirana širina: b = 1.0 m

Uzdužna armatura

	Osnovno	Dodatno		$A_{s,ult}$	$\Delta A_{s,serv}$	$A_{s,min}$	$A_{s,req}$	$A_{s,prov}$	$A_{s,max}$	Status
		Korisnički	Osigurano	[mm²]	[mm²]	[mm²]	[mm²]	[mm²]	[mm²]	
[1+]	**ϕ12/150**	bez armat.	bez armat.	24	---	492	**492**	**754**	2308	**U REDU**
[2+]	**ϕ12/150**	bez armat.	bez armat.	96	---	476	**476**	**754**	2308	**U REDU**
[1-]	**ϕ12/150**	bez armat.	bez armat.	146	---	492	**492**	**754**	2308	**U REDU**
[2-]	**ϕ12/150**	bez armat.	bez armat.	235	---	476	**476**	**754**	2308	**U REDU**

$A_{s,ult}$ - potrebna površina armature prema proračunu GSN; $\Delta A_{s,serv}$ - povećanje potrebne površine armature prema GSU proračunu; $A_{s,req}$ - potrebna površina armature uključujući detalje; $A_{s,prov}$ - osigurana površina armature (zbroj od promatranih)

Granično stanje nosivosti

Proračunato u smjerovima slojeva armature:

	Slučaj	α_s [°]	m_{Ed} [kNm]	n_{Ed} [kN]	d [mm]	x [mm]	z [mm]	F_{cd} [kN]	F_{sd} [kN]	$A_{s,ult}$ [mm²]
[1+]	ULS-Set B (auto)/2	0.0	**-1.38**	**12.73**	364.0	0.0	327.6	0.0	10.6	**24**
[2+]	ULS-Set B (auto)/2	90.0	**-11.65**	**15.04**	352.0	2.1	351.2	-26.7	41.7	**96**
[1-]	ULS-Set B (auto)/3	0.0	**20.79**	**11.17**	364.0	4.2	362.4	-52.3	63.5	**146**
[2-]	ULS-Set B (auto)/3	90.0	**33.65**	**9.88**	352.0	7.4	349.1	-92.1	102.0	**235**

α_s - smjer armaturnog sloja; m_{Ed}, n_{Ed} - ponovno proračunato projektirano opterećenje, F_{cd} - sila otpornosti u betonu; F_{sd} - sila otpornosti u armaturi; $A_{s,ult}$ - potrebna površina armature prema proračunu GSN (>10 mm²)

ULS-Set B (auto)/3	1.35*G+1.35*G1+1.50*S+0.90*WmaxL
ULS-Set B (auto)/2	G+G1+1.50*WmaxD

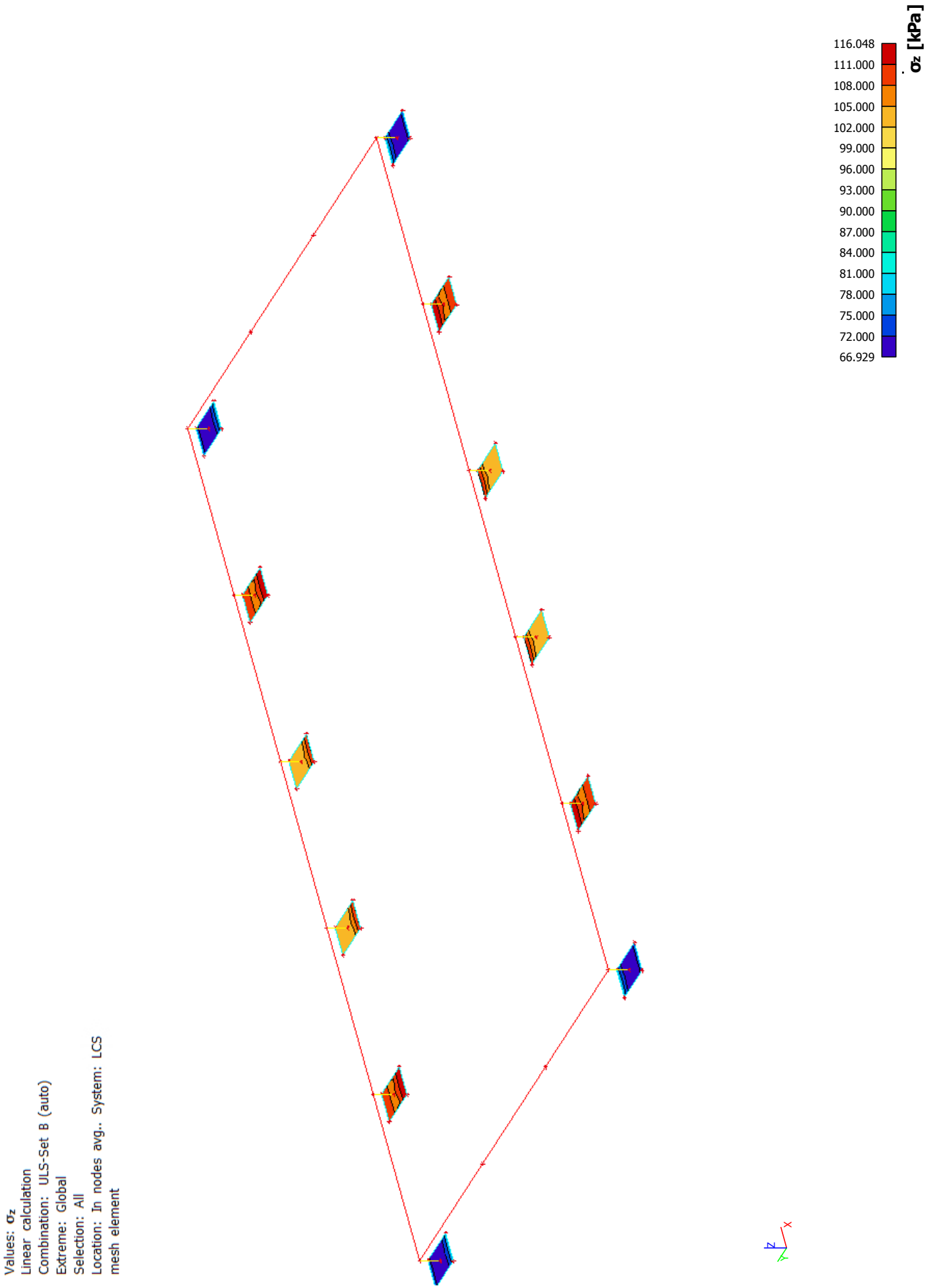
Posmična armatura

	Slučaj	θ [°]	v_{Ed} [kN/m]	$A_{sl,x}$ [mm²]	$A_{sl,y}$ [mm²]	ρ_l [%]	$v_{Rd,c}$ [kN/m]	$v_{Rd,max}$ [kN/m]	$A_{sw,req}$ [mm²/m²]	Status
[-]	ULS-Set B (auto)/3	40.0	**60.2**	754	754	0.211	144.8	1573.2	---	**U REDU**

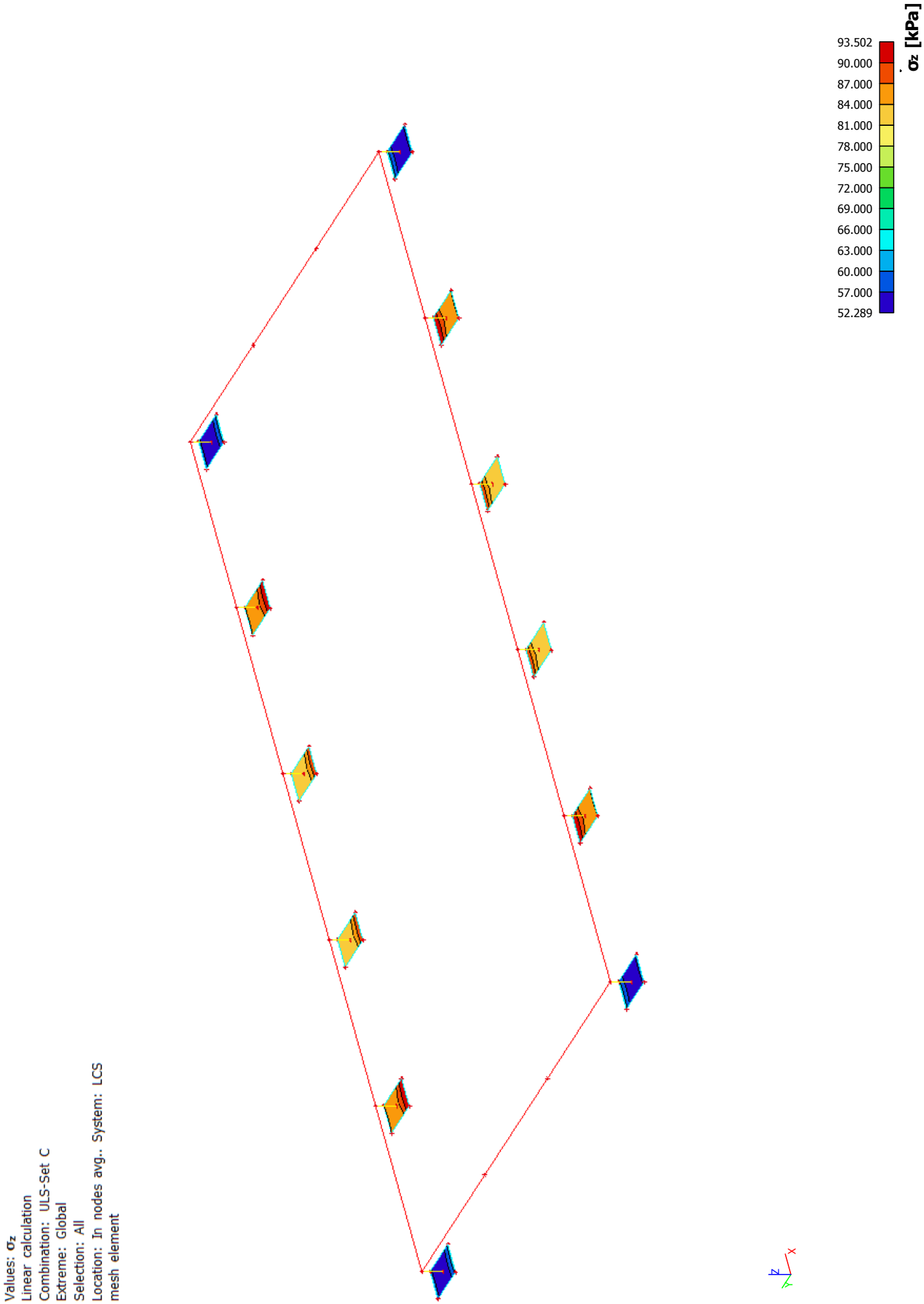
v_{Ed} - proračun posmične sile, $A_{sl,x/y}$ - vlačna uzdužna armatura, ρ_l - odgovarajući armaturni omjer, v_{Rdc} - otpornost na posmik bez posmične armatura, $v_{Rd,max}$ - maksimalna posmična otpornost betona, $A_{sw,req}$ - potrebna posmična armatura

9. Uticaji na temeljno tlo

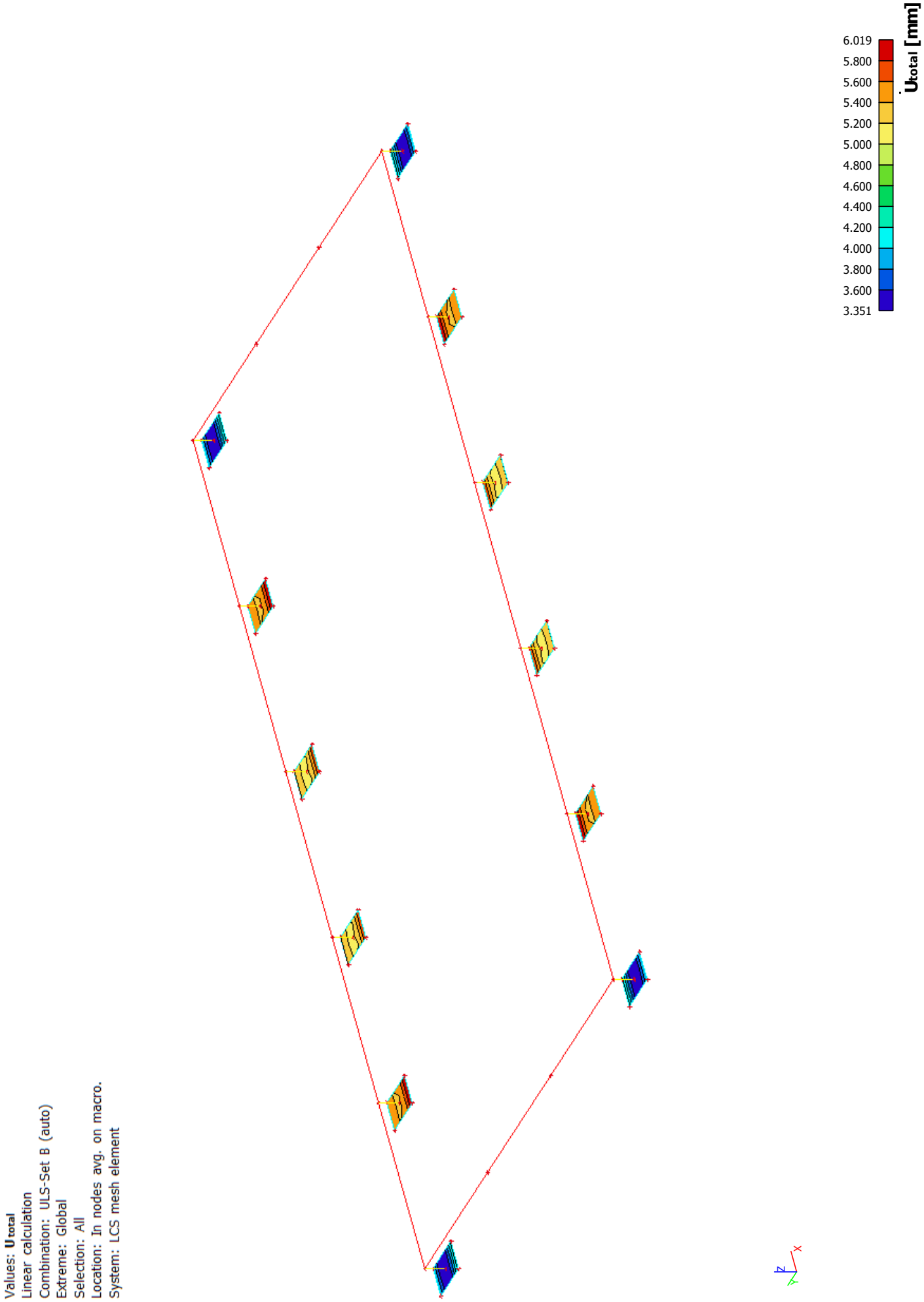
9.1. Kontaktni naponi; σ_z; SET_B



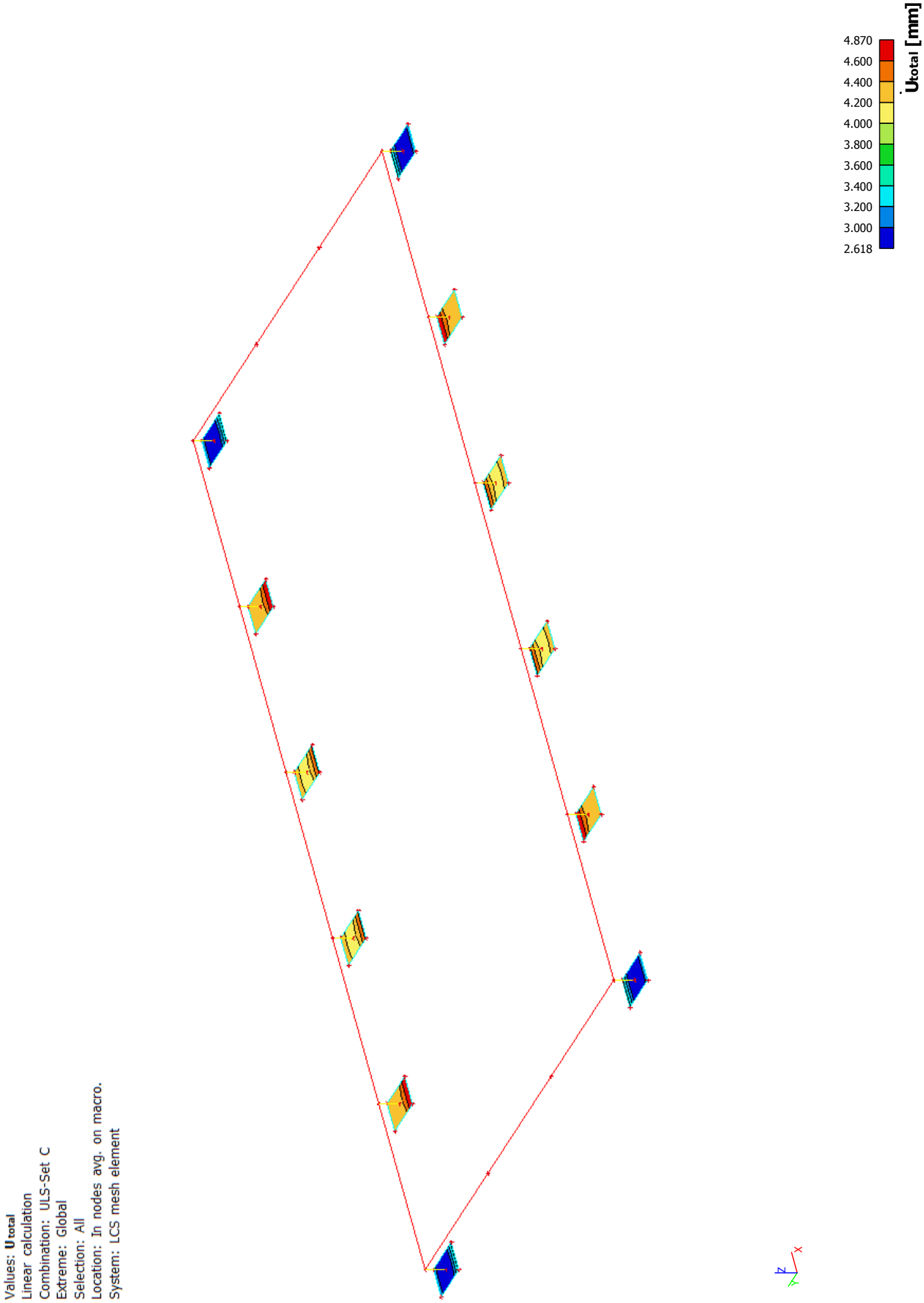
9.2. Kontaktni naponi; σ_z; SET_C



9.3. Sleganje temelja; U_total; SET_B



9.4. Sleganje temelja; U_total; SET_C



NOSIVOST TEMELJNOG TLA PREMA EC_7

zapreminska težina tla	γ=	15.9	kN/m³
ugao unutrašnjeg trenja	Ø=	27	°
kohezija	c=	0	kPa
dubina fundiranja	Df=	0.8	m
Stopa temelja LxB=1.5x1m	B=	1	m

PP1-1 (A1+M1+R1)			
γØ=1	tgØ=	0.509	
	Nq=	13.177	
	Nc=	23.924	
	Nγ=	12.396	
	Sq=	1.303	
	Sc=	1.327	
	Sγ=	0.800	
	iq=	0.937	
	iγ=	0.894	
	Rd=	275.120	kPa

PP1-2 (A2+M2+R1)			
γØ=1.25	tgØ=	0.408	
	γØ=	1.250	
	tgØ'=	0.326	
	Nq=	7.973	
	Nc=	17.091	
	Nγ=	5.690	
	Sq=	1.252	
	Sc=	1.288	
	Sγ=	0.800	
	iq=	0.937	
	iγ=	0.894	
	Rd=	151.327	kPa

PP2 (A1+M1+R2)			
	R=	275.120	
γR=1.4	γR=	1.4	
	Rd=	196.515	kPa

PP3 (A1 ili A2+M2+R3)			
	γØ=	1.25	
	γR=	1.4	
	Rd=	151.327	kPa

min	Rd=	151.327	kPa

SCIA - Rezultati			
	Set B	116.048	kPa
	Set C	93.502	kPa

Project:	**Anker stope stuba nadstrešnice**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

Material

Steel	S 235
Concrete	C25/30

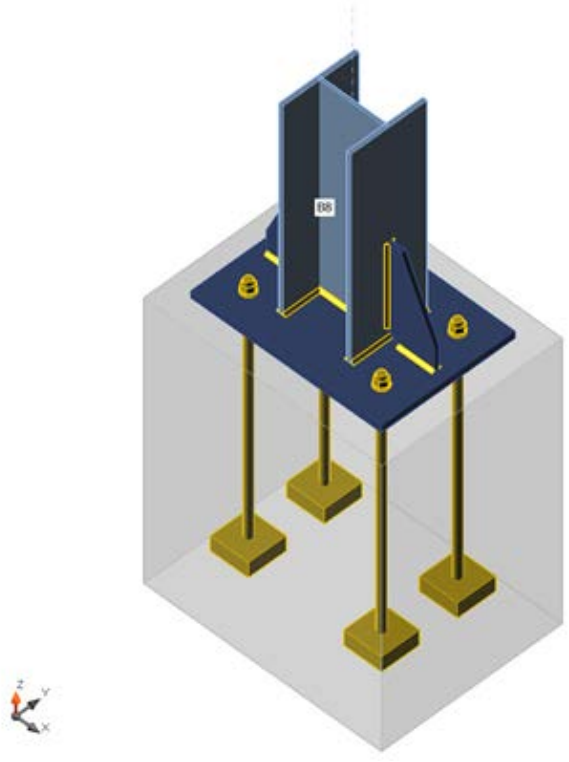
Project item Con N15

Design

Name	Con N15
Description	
Analysis	Stress, strain/ loads in equilibrium

Beams and columns

Name	Cross-section	β – Direction [°]	γ - Pitch [°]	α - Rotation [°]	Offset ex [mm]	Offset ey [mm]	Offset ez [mm]	Forces in
B8	1 - HEA160	0.0	-90.0	0.0	0	0	0	Position



Cross-sections

Name	Material
1 - HEA160	S 235

Anchors

Name	Bolt assembly	Diameter [mm]	fu [MPa]	Gross area [mm^2]
M16 8.8	M16 8.8	16	800.0	201

Project:	**Anker stope stuba nadstrešnice**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

Load effects (forces in equilibrium)

Name	Member	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
ULS-Set(20)	B8	-100.0	0.0	-2.0	0.0	5.0	0.0

Foundation block

Item	Value	Unit
CB 1		
Dimensions	380 x 500	mm
Depth	600	mm
Anchor	M16 8.8	
Anchoring length	500	mm
Shear force transfer	Anchors	

Check

Summary

Name	Value	Status
Analysis	100.0%	OK
Plates	0.0 < 5%	OK
Anchors	5.3 < 100%	OK
Welds	35.7 < 100%	OK
Concrete block	12.4 < 100%	OK
Buckling	Not calculated	

Plates

Name	Thickness [mm]	Loads	σ_{Ed} [MPa]	ε_{Pl} [%]	Status
B8-bfl 1	9.0	ULS-Set(20)	62.4	0.0	OK
B8-tfl 1	9.0	ULS-Set(20)	20.5	0.0	OK
B8-w 1	6.0	ULS-Set(20)	48.5	0.0	OK
BP1	15.0	ULS-Set(20)	34.8	0.0	OK
SP1	10.0	ULS-Set(20)	59.3	0.0	OK
SP2	10.0	ULS-Set(20)	9.0	0.0	OK

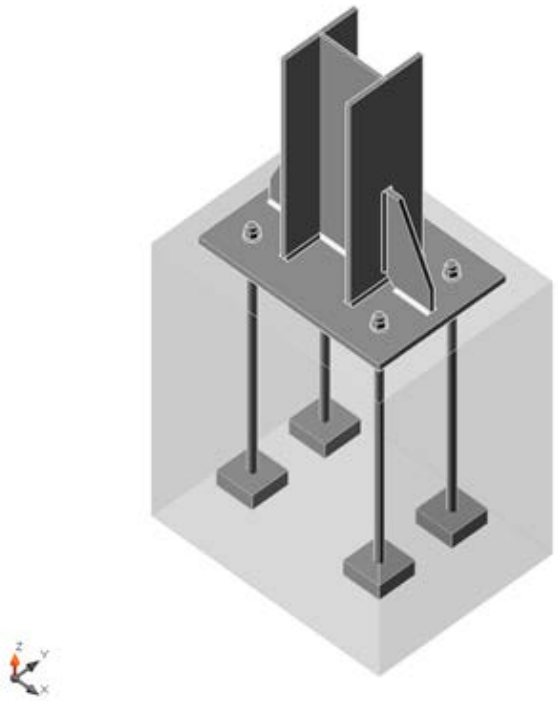
Design data

Material	f_y [MPa]	ε_{lim} [%]
S 235	235.0	5.0

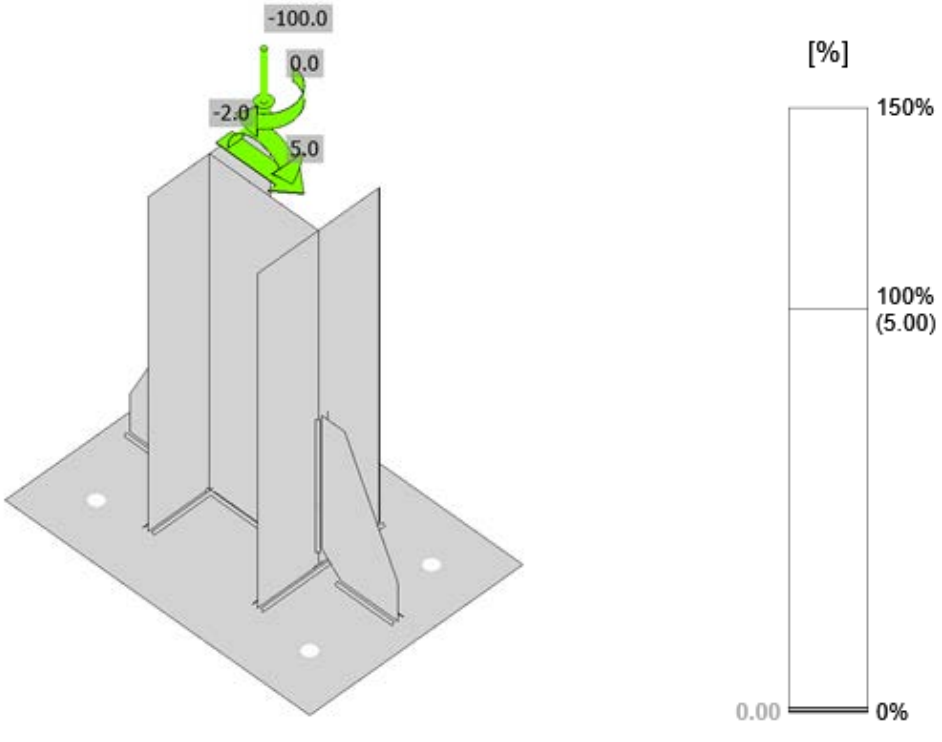
Symbol explanation

ε_{Pl}	Strain
σ_{Ed}	Eq. stress
f_y	Yield strength
ε_{lim}	Limit of plastic strain

Project:	**Anker stope stuba nadstrešnice**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

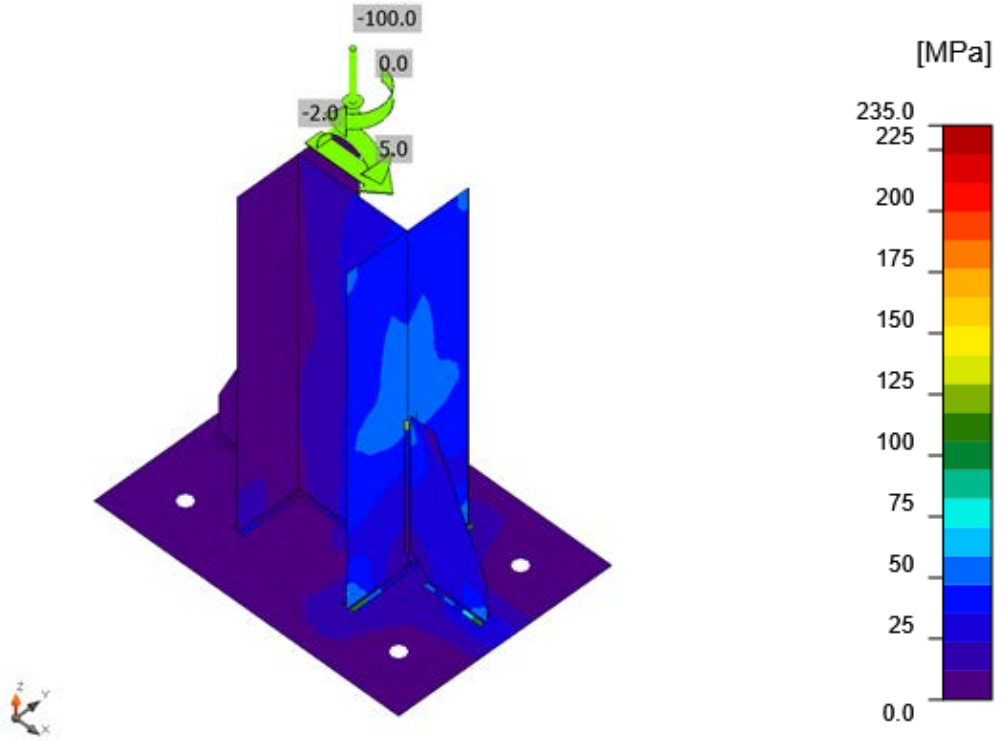


Overall check, ULS-Set(20)



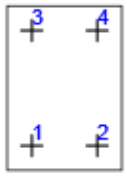
Strain check, ULS-Set(20)

Project:	**Anker stope stuba nadstrešnice**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**



Equivalent stress, ULS-Set(20)

Anchors

	Name	Loads	$F_{t,Ed}$ [kN]	V [kN]	N_{rdc} [kN]	N_{rdp} [kN]	Ut_t [%]	$F_{b,Rd}$ [kN]	Ut_s [%]	Ut_{ts} [%]	$V_{Rd,cp}$ [kN]	$V_{Rd,c}$ [kN]	Status
	A1	ULS-Set(20)	0.0	0.5	0.0	645.7	0.0	172.8	5.3	1.2	32.4	10.0	OK
	A2	ULS-Set(20)	0.0	0.5	0.0	645.7	0.0	172.8	5.3	1.2	32.4	10.0	OK
	A3	ULS-Set(20)	0.0	0.5	0.0	645.7	0.0	172.8	4.6	1.0	32.4	10.0	OK
	A4	ULS-Set(20)	0.0	0.5	0.0	645.7	0.0	172.8	4.6	1.0	32.4	10.0	OK

Design data

Name	$F_{t,Rd}$ [kN]	$B_{p,Rd}$ [kN]	$F_{v,Rd}$ [kN]	V_{rds} [kN]	S_{tf} [MN/m]
M16 8.8 - 1	76.9	203.6	50.2	50.2	330

Project:	**Anker stope stuba nadstrešnice**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

Symbol explanation

$F_{t,Rd}$	Bolt tension resistance EN 1993-1-8 tab. 3.4
$F_{t,Ed}$	Tension force
$B_{p,Rd}$	Punching shear resistance
V	Resultant of shear forces Vy, Vz in bolt
$F_{v,Rd}$	Bolt shear resistance EN_1993-1-8 table 3.4
V_{rds}	Characteristic anchor resistance ETAG 001 Annex C (5.2.3.2)
S_{tf}	Anchor longitudinal stiffness
$F_{b,Rd}$	Plate bearing resistance EN 1993-1-8 tab. 3.4
$N_{rd,c}$	Concrete breakout resistance
$N_{rd,p}$	Pull-out resistance
Ut_t	Utilization in tension
Ut_s	Utilization in shear
Ut_{ts}	Utilization in tension and shear EN 1993-1-8 table 3.4
$V_{rd,cp}$	Concrete pry-out failure ETAG 001 Annex C (5.2.3.3)
$V_{rd,c}$	Concrete edge failure ETAG 001 Annex C (5.2.3.4)
C_{pf}	Concrete pry-out failure ETAG 001 Annex C (5.2.3.3)
C_{ef}	Concrete edge failure ETAG 001 Annex C (5.2.3.4)

Welds (Plastic redistribution)

Item	Edge	Throat th. [mm]	Length [mm]	Loads	$\sigma_{w,Ed}$ [MPa]	ε_{Pl} [%]	σ_U [MPa]	$\tau_{||}$ [MPa]	τ_U [MPa]	Ut [%]	Ut_c [%]	Status
BP1	B8-bfl 1	◢4.0◣	160	ULS-Set(20)	108.4	0.0	-42.6	-36.9	-44.1	30.1	15.3	OK
		◢4.0◣	160	ULS-Set(20)	110.9	0.0	-45.0	39.3	43.4	30.8	15.5	OK
BP1	B8-tfl 1	◢4.0◣	160	ULS-Set(20)	40.5	0.0	-15.1	-14.0	-16.6	11.2	5.2	OK
		◢4.0◣	160	ULS-Set(20)	43.0	0.0	-17.6	15.9	16.1	11.9	5.7	OK
BP1	B8-w 1	◢4.0◣	143	ULS-Set(20)	32.4	0.0	-15.4	6.1	-15.3	9.0	5.9	OK
		◢4.0◣	143	ULS-Set(20)	32.5	0.0	-15.3	-6.1	15.4	9.0	5.9	OK
B8-bfl 1	SP1	◢4.0◣	175	ULS-Set(20)	128.4	0.0	-36.7	-60.9	-36.7	35.7	8.9	OK
		◢4.0◣	175	ULS-Set(20)	128.4	0.0	-36.6	60.9	36.6	35.7	8.9	OK
BP1	SP1	◢4.0◣	75	ULS-Set(20)	106.6	0.0	-47.4	28.3	-47.3	29.6	17.2	OK
		◢4.0◣	75	ULS-Set(20)	106.6	0.0	-47.2	-28.3	47.4	29.6	17.4	OK
B8-tfl 1	SP2	◢4.0◣	175	ULS-Set(20)	6.4	0.0	-1.3	-3.4	-1.3	1.8	1.4	OK
		◢4.0◣	175	ULS-Set(20)	6.4	0.0	-1.3	3.4	1.3	1.8	1.4	OK
BP1	SP2	◢4.0◣	75	ULS-Set(20)	16.1	0.0	-5.4	6.7	-5.7	4.5	2.9	OK
		◢4.0◣	75	ULS-Set(20)	15.8	0.0	-5.8	-6.5	5.5	4.4	2.8	OK

Design data

	β_w [-]	$\sigma_{w,Rd}$ [MPa]	0.9 σ [MPa]
S 235	0.80	360.0	259.2

Project:	**Anker stope stuba nadstrešnice**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

Symbol explanation

ε_{Pl}	Strain
$\sigma_{w,Ed}$	Equivalent stress
$\sigma_{w,Rd}$	Equivalent stress resistance
$\sigma_{\perp}$	Perpendicular stress
$\tau_{\parallel}$	Shear stress parallel to weld axis
$\tau_{\perp}$	Shear stress perpendicular to weld axis
0.9 σ	Perpendicular stress resistance - 0.9*fu/γM2
β_w	Corelation factor EN 1993-1-8 tab. 4.1
Ut	Utilization
Utc	Weld capacity utilization

Concrete block

Item	Loads	c [mm]	A_{eff} [mm^2]	σ [MPa]	k_j [-]	F_{jd} [MPa]	Ut [%]	Status
CB 1	ULS-Set(20)	31	45740	2.2	1.60	17.8	12.4	OK

Symbol explanation

c	Bearing width
A_{eff}	Effective area
σ	Average stress in concrete
k_j	Concentration factor
F_{jd}	The ultimate bearing strength of the concrete block
Ut	Utilization

Buckling

Buckling analysis was not calculated.

Project:	**Montažni nastavak donjeg pojasa**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

Material

Steel	S 235

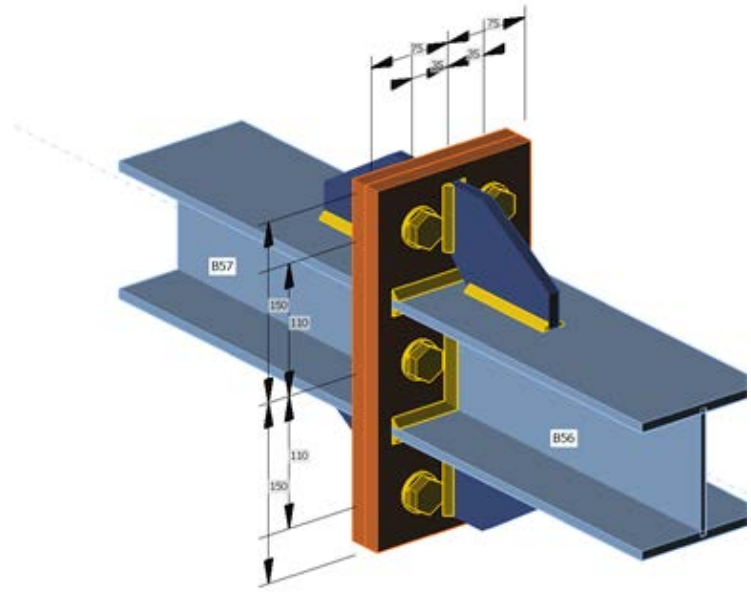
Project item Con N68

Design

Name	Con N68
Description	
Analysis	Stress, strain/ loads in equilibrium

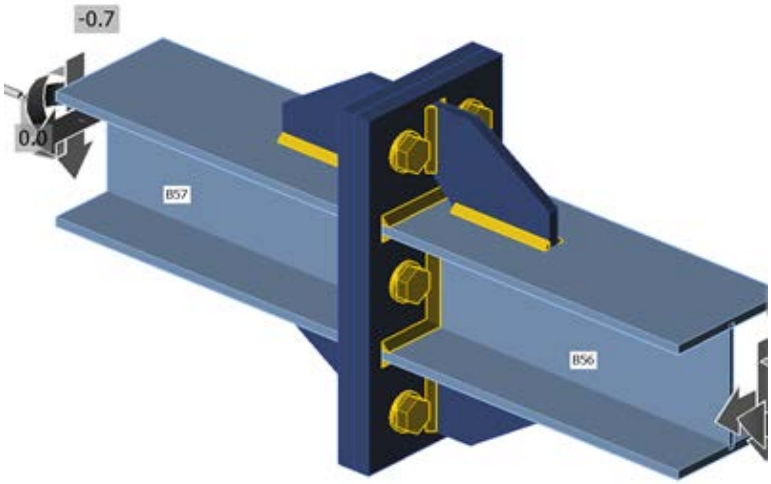
Beams and columns

Name	Cross-section	β – Direction [°]	γ - Pitch [°]	α - Rotation [°]	Offset ex [mm]	Offset ey [mm]	Offset ez [mm]	Forces in
B56	1 - HEA120	-90.0	0.0	0.0	0	0	0	Position
B57	1 - HEA120	90.0	0.0	0.0	0	0	0	Position



PP1

Project:	**Montažni nastavak donjeg pojasa**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**



Weld8

Cross-sections

Name	Material
1 - HEA120	S 235

Bolts

Name	Bolt assembly	Diameter [mm]	fu [MPa]	Gross area [mm^2]
M16 10.9	M16 10.9	16	1000.0	201

Load effects (forces in equilibrium)

Name	Member	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
ULS-Set(2)	B56	200.0	0.0	-0.7	0.0	0.0	0.0
	B57	200.0	0.0	-0.7	0.0	0.0	0.0
ULS-Set(13)	B56	100.0	0.0	-0.5	0.0	0.0	0.0
	B57	100.0	0.0	-0.6	0.0	0.0	0.0

Project:	**Montažni nastavak donjeg pojasa**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

Check

Summary

Name	Value	Status
Analysis	100.0%	OK
Plates	0.0 < 5%	OK
Bolts	40.0 < 100%	OK
Welds	65.6 < 100%	OK
Buckling	Not calculated	

Plates

Name	Thickness [mm]	Loads	σ_{Ed} [MPa]	ε_{Pl} [%]	Status
B56-bfl 1	8.0	ULS-Set(2)	109.1	0.0	OK
B56-tfl 1	8.0	ULS-Set(2)	112.2	0.0	OK
B56-w 1	5.0	ULS-Set(2)	133.9	0.0	OK
B57-bfl 1	8.0	ULS-Set(2)	111.3	0.0	OK
B57-tfl 1	8.0	ULS-Set(2)	110.0	0.0	OK
B57-w 1	5.0	ULS-Set(2)	133.9	0.0	OK
PP1a	15.0	ULS-Set(2)	158.1	0.0	OK
PP1b	15.0	ULS-Set(2)	158.0	0.0	OK
SP1	10.0	ULS-Set(2)	112.6	0.0	OK
SP2	10.0	ULS-Set(2)	112.0	0.0	OK
SP3	10.0	ULS-Set(2)	111.1	0.0	OK
SP4	10.0	ULS-Set(2)	111.8	0.0	OK

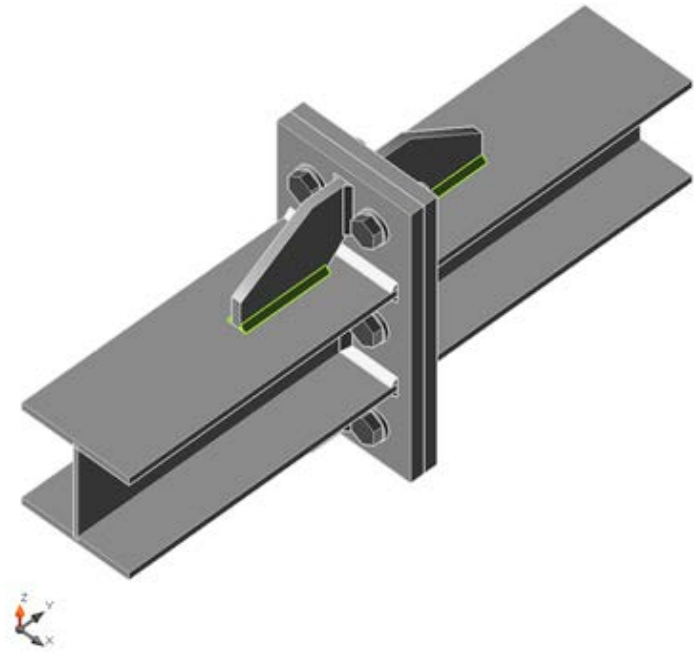
Design data

Material	f_y [MPa]	ε_{lim} [%]
S 235	235.0	5.0

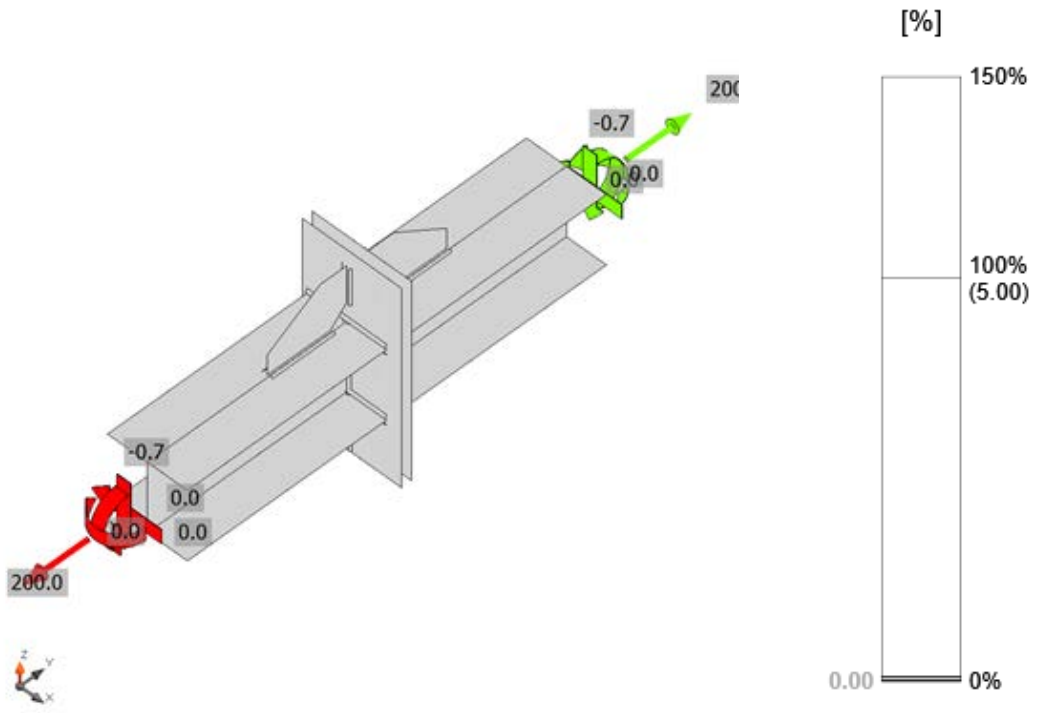
Symbol explanation

ε_{Pl}	Strain
σ_{Ed}	Eq. stress
f_y	Yield strength
ε_{lim}	Limit of plastic strain

Project:	**Montažni nastavak donjeg pojasa**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

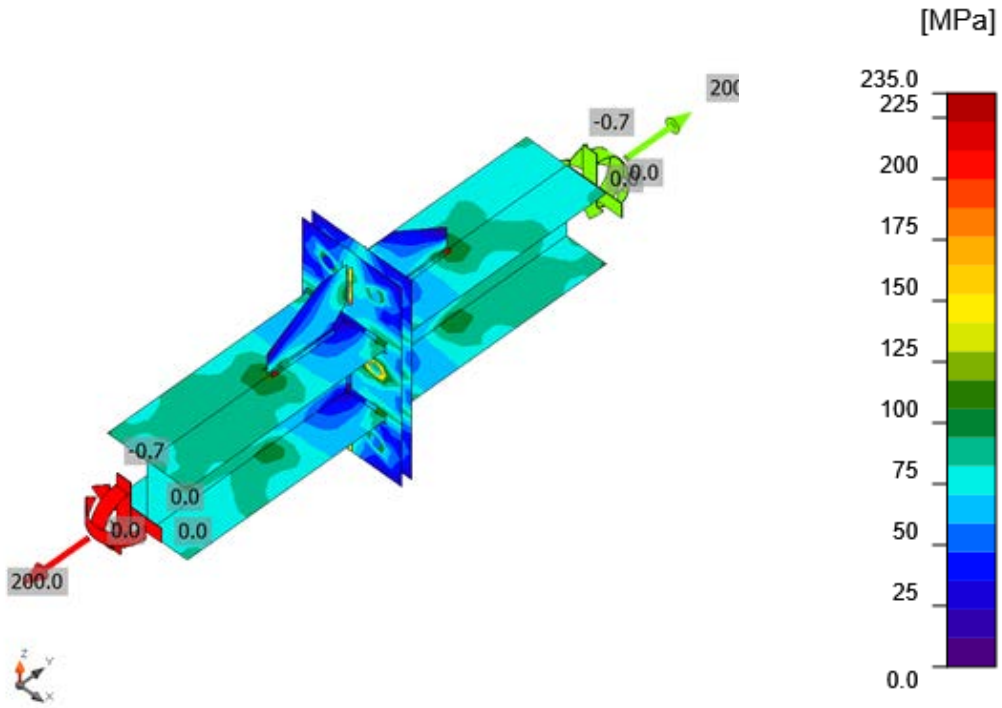


Overall check, ULS-Set(2)



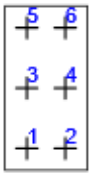
Strain check, ULS-Set(2)

Project:	**Montažni nastavak donjeg pojasa**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**



Equivalent stress, ULS-Set(2)

Bolts

	Name	Loads	$F_{t,Ed}$ [kN]	V [kN]	Ut_t [%]	$F_{b,Rd}$ [kN]	Ut_s [%]	Ut_{ts} [%]	Status
	B1	ULS-Set(2)	29.7	0.1	26.3	128.0	0.2	18.9	OK
	B2	ULS-Set(2)	30.0	0.1	26.5	128.0	0.2	19.1	OK
	B3	ULS-Set(2)	44.7	0.1	39.5	172.8	0.2	28.4	OK
	B4	ULS-Set(2)	45.3	0.1	40.0	172.8	0.2	28.8	OK
	B5	ULS-Set(2)	29.9	0.1	26.4	128.0	0.2	19.0	OK
	B6	ULS-Set(2)	30.1	0.1	26.6	128.0	0.2	19.2	OK

Design data

Name	$F_{t,Rd}$ [kN]	$B_{p,Rd}$ [kN]	$F_{v,Rd}$ [kN]
M16 10.9 - 1	113.0	230.3	62.8

Symbol explanation

$F_{t,Rd}$	Bolt tension resistance EN 1993-1-8 tab. 3.4
$F_{t,Ed}$	Tension force
$B_{p,Rd}$	Punching shear resistance
V	Resultant of shear forces Vy, Vz in bolt
$F_{v,Rd}$	Bolt shear resistance EN_1993-1-8 table 3.4
$F_{b,Rd}$	Plate bearing resistance EN 1993-1-8 tab. 3.4
Ut_t	Utilization in tension
Ut_s	Utilization in shear
Ut_{ts}	Utilization in tension and shear EN 1993-1-8 table 3.4

Project:	**Montažni nastavak donjeg pojasa**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

Welds (Plastic redistribution)

Item	Edge	Throat th. [mm]	Length [mm]	Loads	$\sigma_{w,Ed}$ [MPa]	ε_{Pl} [%]	σ_U [MPa]	$\tau_{\perp}$ [MPa]	τ_U [MPa]	Ut [%]	Ut_c [%]	Status
PP1a	B56-bfl 1	◢5.0◣	120	ULS-Set(2)	106.6	0.0	49.6	23.1	49.3	29.6	17.7	OK
		◢5.0◣	120	ULS-Set(2)	101.0	0.0	46.1	-23.4	-46.3	28.1	17.0	OK
PP1a	B56-tfl 1	◢5.0◣	120	ULS-Set(2)	101.3	0.0	46.2	23.5	46.5	28.1	17.0	OK
		◢5.0◣	120	ULS-Set(2)	107.3	0.0	50.0	-23.3	-49.6	29.8	17.9	OK
PP1a	B56-w 1	◢5.0◣	106	ULS-Set(2)	110.2	0.0	55.2	1.2	55.0	30.6	16.4	OK
		◢5.0◣	106	ULS-Set(2)	110.2	0.0	55.1	-1.1	-55.1	30.6	16.3	OK
PP1b	B57-bfl 1	◢5.0◣	120	ULS-Set(2)	107.1	0.0	49.8	-23.1	49.6	29.8	17.9	OK
		◢5.0◣	120	ULS-Set(2)	101.2	0.0	46.1	23.3	-46.4	28.1	17.1	OK
PP1b	B57-tfl 1	◢5.0◣	120	ULS-Set(2)	101.3	0.0	46.1	-23.6	46.4	28.1	17.0	OK
		◢5.0◣	120	ULS-Set(2)	106.9	0.0	49.7	23.3	-49.4	29.7	17.7	OK
PP1b	B57-w 1	◢5.0◣	106	ULS-Set(2)	110.3	0.0	55.0	-0.1	55.2	30.6	16.3	OK
		◢5.0◣	106	ULS-Set(2)	110.1	0.0	55.2	0.1	-55.0	30.6	16.4	OK
B57-tfl 1	SP1	◢4.0◣	95	ULS-Set(2)	234.2	0.0	67.5	-110.5	67.6	65.1	23.9	OK
		◢4.0◣	95	ULS-Set(2)	234.3	0.0	67.7	110.5	-67.6	65.1	23.9	OK
PP1b	SP1	◢4.0◣	55	ULS-Set(2)	181.1	0.0	8.9	103.9	10.1	50.3	41.9	OK
		◢4.0◣	55	ULS-Set(2)	179.1	0.0	10.0	-102.9	-8.8	49.7	41.6	OK
B56-tfl 1	SP2	◢4.0◣	95	ULS-Set(2)	236.2	0.0	67.9	-111.6	67.8	65.6	23.8	OK
		◢4.0◣	95	ULS-Set(2)	236.1	0.0	67.7	111.6	-67.8	65.6	23.8	OK
PP1a	SP2	◢4.0◣	55	ULS-Set(2)	178.2	0.0	9.6	102.4	8.3	49.5	41.5	OK
		◢4.0◣	55	ULS-Set(2)	180.3	0.0	8.4	-103.5	-9.7	50.1	41.8	OK
B57-bfl 1	SP3	◢4.0◣	95	ULS-Set(2)	234.2	0.0	67.2	-110.8	67.1	65.1	23.7	OK
		◢4.0◣	95	ULS-Set(2)	234.1	0.0	67.1	110.8	-67.1	65.0	23.7	OK
PP1b	SP3	◢4.0◣	55	ULS-Set(2)	175.8	0.0	9.1	101.1	7.7	48.8	41.3	OK
		◢4.0◣	55	ULS-Set(2)	177.9	0.0	7.8	-102.2	-9.1	49.4	41.6	OK
B56-bfl 1	SP4	◢4.0◣	95	ULS-Set(2)	232.2	0.0	66.9	-109.6	66.9	64.5	23.7	OK
		◢4.0◣	95	ULS-Set(2)	232.3	0.0	67.0	109.6	-66.9	64.5	23.7	OK
PP1a	SP4	◢4.0◣	55	ULS-Set(2)	178.7	0.0	8.2	102.6	9.5	49.7	41.7	OK
		◢4.0◣	55	ULS-Set(2)	176.6	0.0	9.5	-101.5	-8.2	49.1	41.4	OK

Design data

	β_w [-]	$\sigma_{w,Rd}$ [MPa]	0.9 σ [MPa]
S 235	0.80	360.0	259.2

Project:	**Montažni nastavak donjeg pojasa**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

Symbol explanation

ε_{Pl}	Strain
$\sigma_{w,Ed}$	Equivalent stress
$\sigma_{w,Rd}$	Equivalent stress resistance
$\sigma_{\perp}$	Perpendicular stress
$\tau_{\parallel}$	Shear stress parallel to weld axis
$\tau_{\perp}$	Shear stress perpendicular to weld axis
0.9 σ	Perpendicular stress resistance - 0.9*fu/γM2
β_w	Corelation factor EN 1993-1-8 tab. 4.1
Ut	Utilization
Utc	Weld capacity utilization

Buckling

Buckling analysis was not calculated.

Project:	**Veza stuba i rešetke**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

Material

Steel	S 235

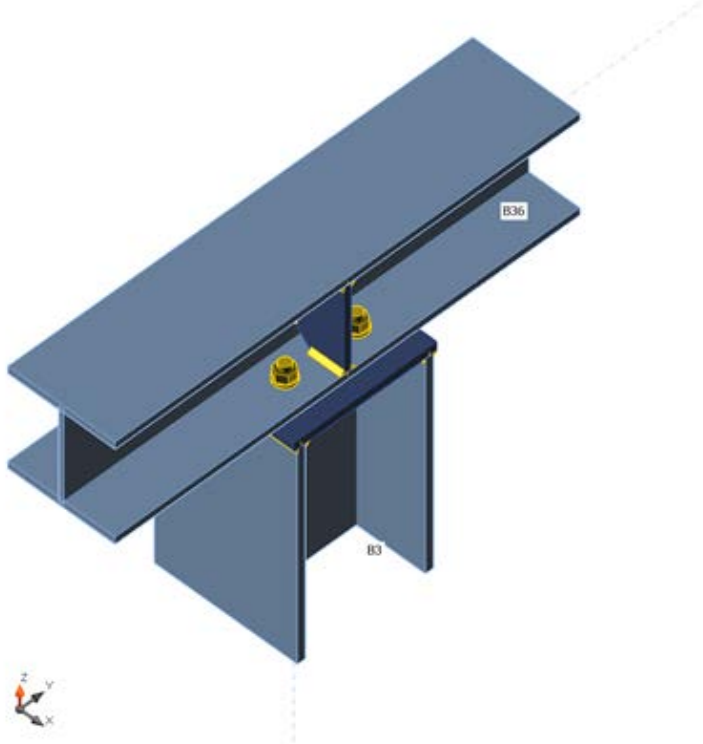
Project item Con N6

Design

Name	Con N6
Description	
Analysis	Stress, strain/ loads in equilibrium

Beams and columns

Name	Cross-section	β – Direction [°]	γ - Pitch [°]	α - Rotation [°]	Offset ex [mm]	Offset ey [mm]	Offset ez [mm]	Forces in
B3	1 - HEA160	0.0	90.0	90.0	67	0	0	Position
B36	2 - HEA120	-90.0	0.0	0.0	0	0	0	Position



Cross-sections

Name	Material
1 - HEA160	S 235
2 - HEA120	S 235

Bolts

Name	Bolt assembly	Diameter [mm]	fu [MPa]	Gross area [mm^2]
M12 8.8	M12 8.8	12	800.0	113

Project:	**Veza stuba i rešetke**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

Load effects (forces in equilibrium)

Name	Member	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
ULS-Set(1)	B3	44.9	0.0	-0.6	0.0	0.0	0.0
	B36	-21.7	0.0	1.9	0.0	3.2	0.0
	B36	21.1	0.0	2.4	0.0	-3.2	0.0
ULS-Seis(5)	B3	-22.4	0.0	0.3	0.0	0.0	0.0
	B36	10.0	-0.2	-1.3	0.0	-1.8	0.2
	B36	-9.8	0.0	-1.6	0.0	1.8	-0.2
ULS-Seis(6)	B3	-22.5	0.0	0.3	0.0	0.0	0.0
	B36	10.1	-0.2	-1.3	0.0	-1.8	0.2
	B36	-9.8	0.0	-1.6	0.0	1.8	-0.2
ULS-Set(7)	B3	-9.5	0.0	6.6	0.0	0.0	0.0
	B36	28.6	-0.1	-3.2	0.0	-2.3	0.1
	B36	-22.0	0.0	-1.6	0.0	2.3	-0.1
ULS-Set(8)	B3	-32.9	0.0	-6.6	0.0	0.0	0.0
	B36	-4.1	0.0	0.3	0.0	-1.8	0.0
	B36	-2.5	0.0	-1.9	0.0	1.8	0.0
ULS-Seis(11)	B3	-22.6	0.0	0.4	0.0	0.0	0.0
	B36	10.6	-0.2	-1.4	0.0	-1.9	0.2
	B36	-10.2	0.0	-1.6	0.0	1.9	-0.2
ULS-Seis(25)	B3	-22.0	0.0	0.3	0.0	0.0	0.0
	B36	10.0	0.2	-1.3	0.0	-1.8	-0.2
	B36	-9.7	-0.1	-1.6	0.0	1.8	0.2
ULS-Seis(31)	B3	-22.0	0.0	0.3	0.0	0.0	0.0
	B36	10.1	0.2	-1.3	0.0	-1.8	-0.2
	B36	-9.8	-0.1	-1.6	0.0	1.8	0.2

Check

Summary

Name	Value	Status
Analysis	100.0%	OK
Plates	0.0 < 5%	OK
Bolts	25.4 < 100%	OK
Welds	22.2 < 100%	OK
Buckling	Not calculated	

Project:	**Veza stuba i rešetke**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

Plates

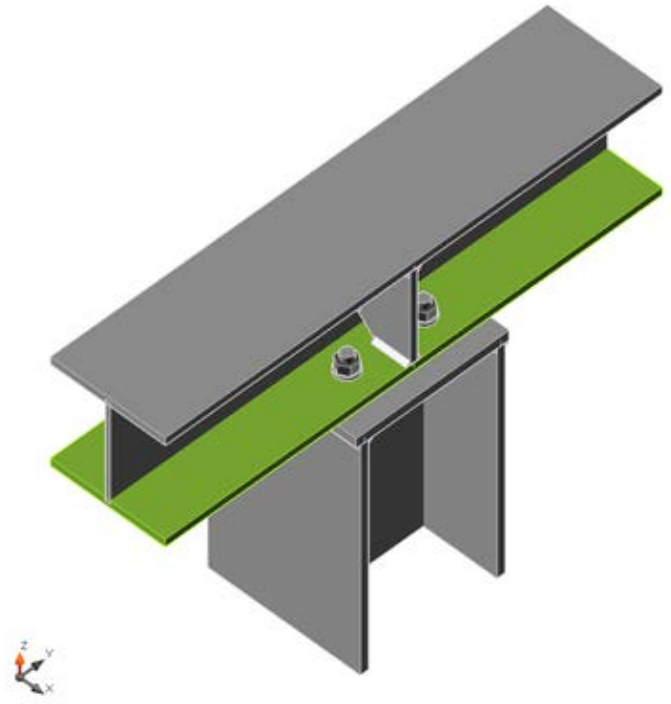
Name	Thickness [mm]	Loads	σ_{Ed} [MPa]	ε_{Pl} [%]	Status
B3-bfl 1	9.0	ULS-Set(1)	45.9	0.0	OK
B3-tfl 1	9.0	ULS-Set(1)	45.9	0.0	OK
B3-w 1	6.0	ULS-Set(1)	40.3	0.0	OK
B36-bfl 1	8.0	ULS-Set(1)	207.6	0.0	OK
B36-tfl 1	8.0	ULS-Set(1)	141.5	0.0	OK
B36-w 1	5.0	ULS-Set(1)	147.9	0.0	OK
EP1	10.0	ULS-Set(1)	109.5	0.0	OK
STIFF1a	8.0	ULS-Set(1)	48.4	0.0	OK
STIFF1b	8.0	ULS-Set(1)	48.1	0.0	OK

Design data

Material	f_y [MPa]	ε_{lim} [%]
S 235	235.0	5.0

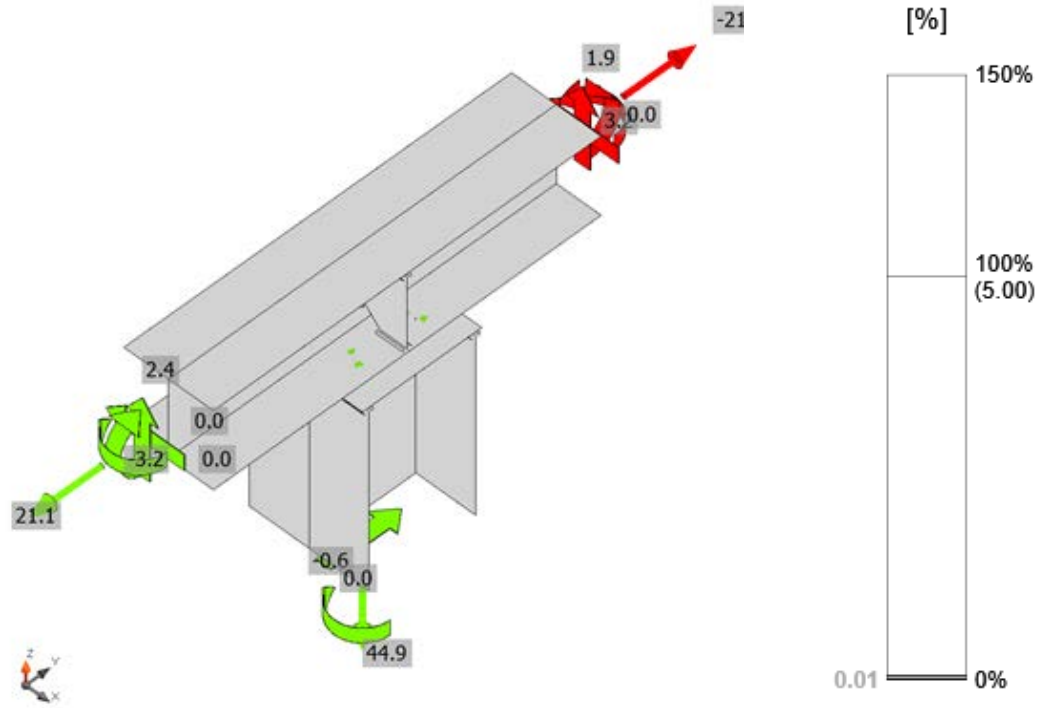
Symbol explanation

ε_{Pl}	Strain
σ_{Ed}	Eq. stress
f_y	Yield strength
ε_{lim}	Limit of plastic strain

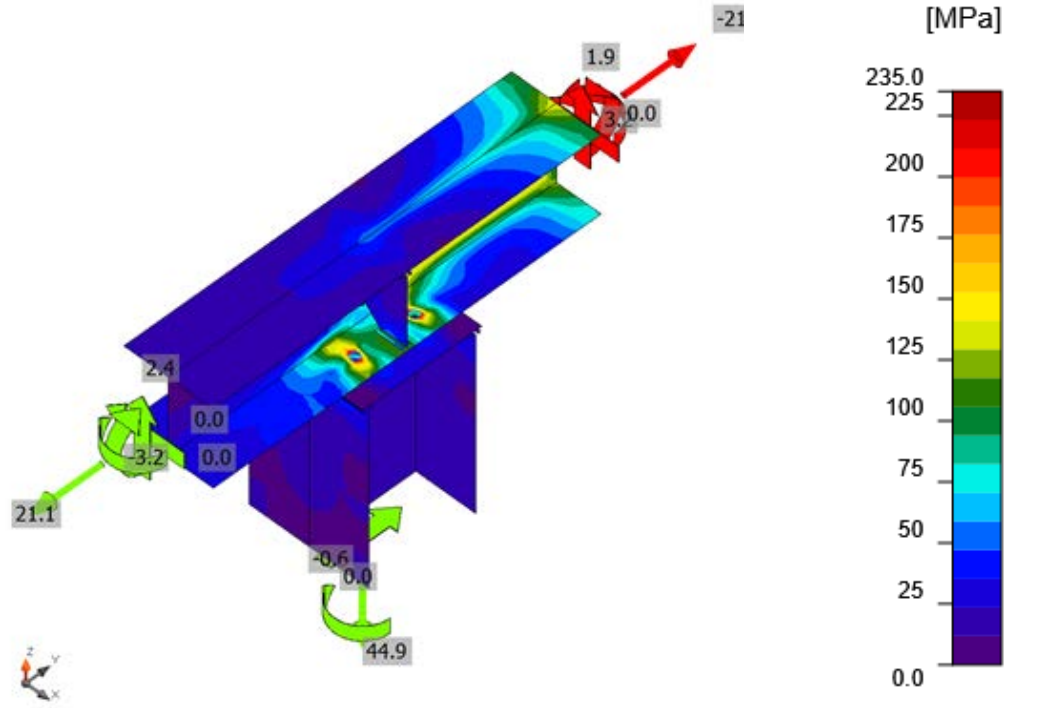


Overall check, ULS-Set(1)

Project:	**Veza stuba i rešetke**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**



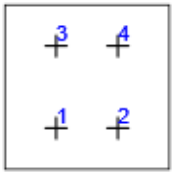
Strain check, ULS-Set(1)



Equivalent stress, ULS-Set(1)

Project:	**Veza stuba i rešetke**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

Bolts

	Name	Loads	$F_{t,Ed}$ [kN]	V [kN]	Ut_t [%]	$F_{b,Rd}$ [kN]	Ut_s [%]	Ut_{ts} [%]	Status
	B1	ULS-Set(1)	12.3	0.2	25.4	69.1	0.7	18.8	OK
	B2	ULS-Set(1)	12.3	0.2	25.4	69.1	0.7	18.9	OK
	B3	ULS-Set(1)	12.2	0.2	25.2	69.1	0.6	18.7	OK
	B4	ULS-Set(1)	12.2	0.2	25.3	69.1	0.6	18.7	OK

Design data

Name	$F_{t,Rd}$ [kN]	$B_{p,Rd}$ [kN]	$F_{v,Rd}$ [kN]
M12 8.8 - 1	48.4	86.9	32.3

Symbol explanation

$F_{t,Rd}$	Bolt tension resistance EN 1993-1-8 tab. 3.4
$F_{t,Ed}$	Tension force
$B_{p,Rd}$	Punching shear resistance
V	Resultant of shear forces Vy, Vz in bolt
$F_{v,Rd}$	Bolt shear resistance EN_1993-1-8 table 3.4
$F_{b,Rd}$	Plate bearing resistance EN 1993-1-8 tab. 3.4
Ut_t	Utilization in tension
Ut_s	Utilization in shear
Ut_{ts}	Utilization in tension and shear EN 1993-1-8 table 3.4

Project:	**Veza stuba i rešetke**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

Welds (Plastic redistribution)

Item	Edge	Throat th. [mm]	Length [mm]	Loads	$\sigma_{w,Ed}$ [MPa]	ε_{Pl} [%]	σ_U [MPa]	$\tau_{\parallel}$ [MPa]	τ_U [MPa]	Ut [%]	Ut_c [%]	Status
EP1	B3-bfl 1	◢3.0◣	160	ULS-Set(1)	65.7	0.0	38.3	24.0	19.3	18.3	12.7	OK
		◢3.0◣	160	ULS-Set(8)	56.1	0.0	-27.7	-6.9	27.3	15.6	4.9	OK
EP1	B3-tfl 1	◢3.0◣	160	ULS-Set(1)	55.5	0.0	-14.8	-16.8	-25.9	15.4	8.2	OK
		◢3.0◣	160	ULS-Set(8)	66.7	0.0	-33.8	-7.8	32.3	18.5	5.6	OK
EP1	B3-w 1	◢3.0◣	143	ULS-Set(1)	80.0	0.0	39.9	-4.1	39.8	22.2	14.2	OK
		◢3.0◣	143	ULS-Set(1)	80.0	0.0	39.8	4.2	-39.8	22.2	14.2	OK
B36-bfl 1	STIFF1a	◢3.0◣	37	ULS-Set(1)	73.7	0.0	33.5	-24.6	28.8	20.5	17.6	OK
		◢3.0◣	37	ULS-Set(1)	57.1	0.0	22.6	14.6	-26.5	15.9	12.1	OK
B36-w 1	STIFF1a	◢3.0◣	56	ULS-Set(1)	51.4	0.0	17.1	24.8	12.8	14.3	8.8	OK
		◢3.0◣	56	ULS-Set(1)	52.0	0.0	3.7	-28.9	-7.9	14.4	9.1	OK
B36-tfl 1	STIFF1a	◢3.0◣	37	ULS-Set(1)	33.8	0.0	-4.4	-19.2	2.2	9.4	4.9	OK
		◢3.0◣	37	ULS-Set(1)	52.6	0.0	22.9	21.9	-16.3	14.6	7.0	OK
B36-bfl 1	STIFF1b	◢3.0◣	36	ULS-Set(1)	57.6	0.0	22.1	-15.7	26.5	16.0	12.1	OK
		◢3.0◣	36	ULS-Set(1)	73.1	0.0	33.0	24.2	-28.9	20.3	17.6	OK
B36-w 1	STIFF1b	◢3.0◣	56	ULS-Set(1)	51.9	0.0	3.7	28.8	7.9	14.4	9.1	OK
		◢3.0◣	56	ULS-Set(1)	51.3	0.0	17.1	-24.8	-12.9	14.3	8.7	OK
B36-tfl 1	STIFF1b	◢3.0◣	36	ULS-Set(1)	52.6	0.0	22.9	-21.9	16.3	14.6	7.0	OK
		◢3.0◣	36	ULS-Set(1)	33.9	0.0	-4.4	19.3	-2.2	9.4	4.9	OK

Design data

	β_w [-]	$\sigma_{w,Rd}$ [MPa]	0.9 σ [MPa]
S 235	0.80	360.0	259.2

Symbol explanation

ε_{Pl}	Strain
$\sigma_{w,Ed}$	Equivalent stress
$\sigma_{w,Rd}$	Equivalent stress resistance
$\sigma_{\perp}$	Perpendicular stress
$\tau_{\parallel}$	Shear stress parallel to weld axis
$\tau_{\perp}$	Shear stress perpendicular to weld axis
0.9 σ	Perpendicular stress resistance - 0.9*fu/γM2
β_w	Corelation factor EN 1993-1-8 tab. 4.1
Ut	Utilization
Utc	Weld capacity utilization

Buckling

Buckling analysis was not calculated.

Project:	**Montažni nastavak gornjeg pojasa**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

Material

Steel	S 235
Concrete	C25/30

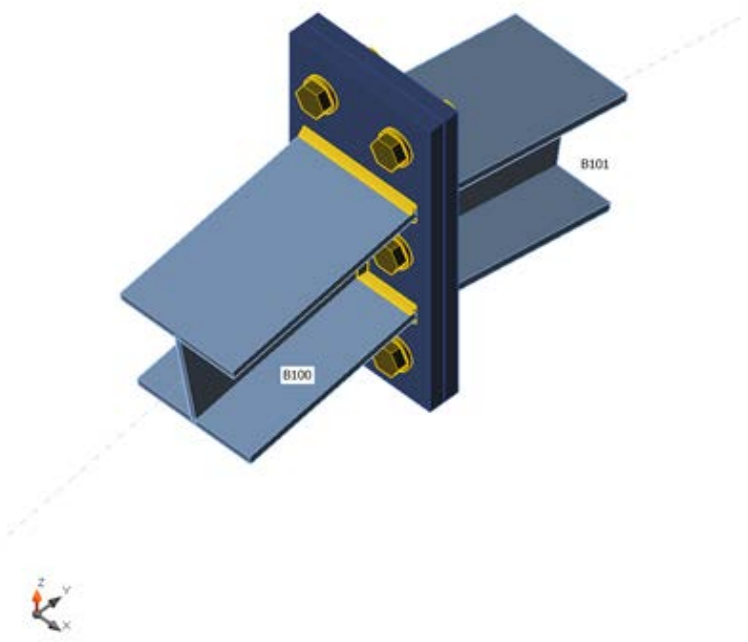
Project item Con N107

Design

Name	Con N107
Description	
Analysis	Stress, strain/ loads in equilibrium

Beams and columns

Name	Cross-section	β – Direction [°]	γ - Pitch [°]	α - Rotation [°]	Offset ex [mm]	Offset ey [mm]	Offset ez [mm]	Forces in
B100	1 - HEA120	-90.0	9.9	0.0	0	0	0	Position
B101	1 - HEA120	90.0	9.9	0.0	0	0	0	Position



Cross-sections

Name	Material
1 - HEA120	S 235

Bolts

Name	Bolt assembly	Diameter [mm]	fu [MPa]	Gross area [mm^2]
M16 10.9	M16 10.9	16	1000.0	201

Project:	**Montažni nastavak gornjeg pojasa**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

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Load effects (forces in equilibrium)

Name	Member	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
ULS-Set(1)	B100	87.0	0.0	1.4	0.0	-0.6	0.0
	B101	87.0	0.0	1.4	0.0	-0.6	0.0
ULS-Set(4)	B100	-201.0	0.0	-5.1	0.0	1.3	0.0
	B101	-201.0	0.0	-5.1	0.0	1.3	0.0
ULS-Set(6)	B100	-34.5	-0.3	1.2	0.0	0.3	0.0
	B101	-57.8	-0.3	-4.3	0.0	0.3	0.0
ULS-Set(11)	B100	-57.8	0.3	-4.3	0.0	0.3	0.0
	B101	-34.5	0.3	1.2	0.0	0.3	0.0

Check

Summary

Name	Value	Status
Analysis	100.0%	OK
Plates	0.0 < 5%	OK
Bolts	24.3 < 100%	OK
Welds	47.0 < 100%	OK
Buckling	Not calculated	

Plates

Name	Thickness [mm]	Loads	σ_{Ed} [MPa]	ε_{Pl} [%]	Status
B100-bfl 1	8.0	ULS-Set(4)	162.7	0.0	OK
B100-tfl 1	8.0	ULS-Set(4)	235.1	0.0	OK
B100-w 1	5.0	ULS-Set(4)	235.0	0.0	OK
B101-bfl 1	8.0	ULS-Set(4)	112.6	0.0	OK
B101-tfl 1	8.0	ULS-Set(4)	89.6	0.0	OK
B101-w 1	5.0	ULS-Set(4)	95.2	0.0	OK
SP1	15.0	ULS-Set(1)	110.2	0.0	OK
SP2	15.0	ULS-Set(1)	114.6	0.0	OK

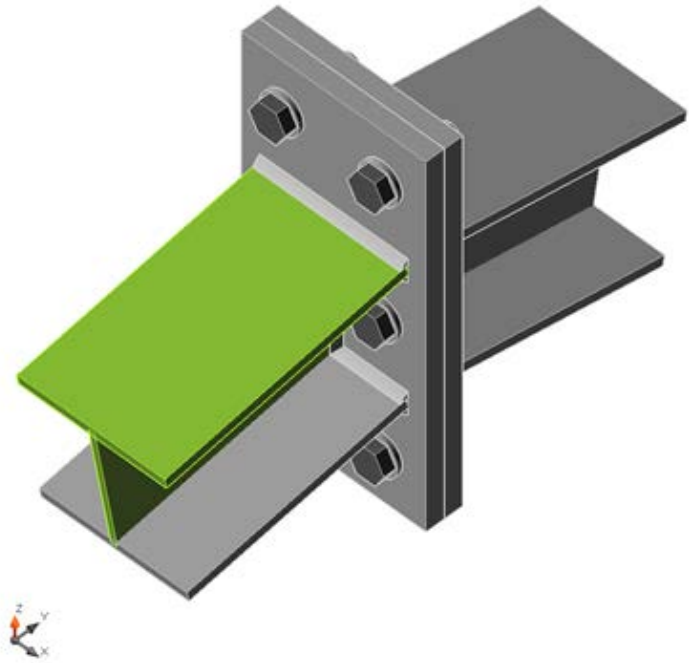
Design data

Material	f_y [MPa]	ε_{lim} [%]
S 235	235.0	5.0

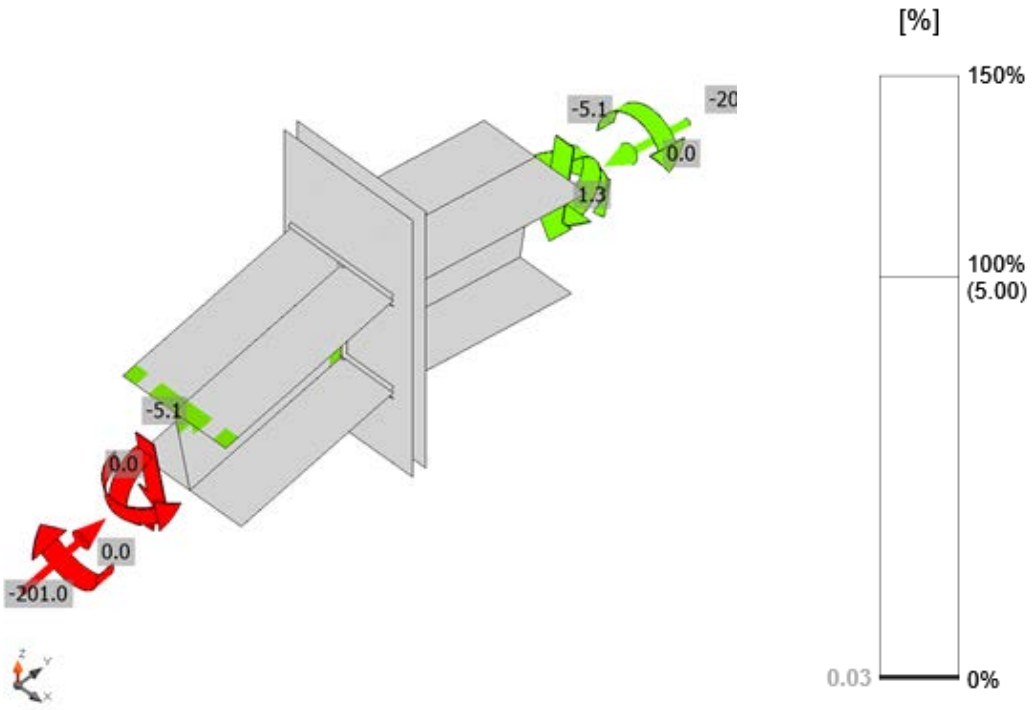
Symbol explanation

ε_{Pl}	Strain
σ_{Ed}	Eq. stress
f_y	Yield strength
ε_{lim}	Limit of plastic strain

Project:	**Montažni nastavak gornjeg pojasa**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

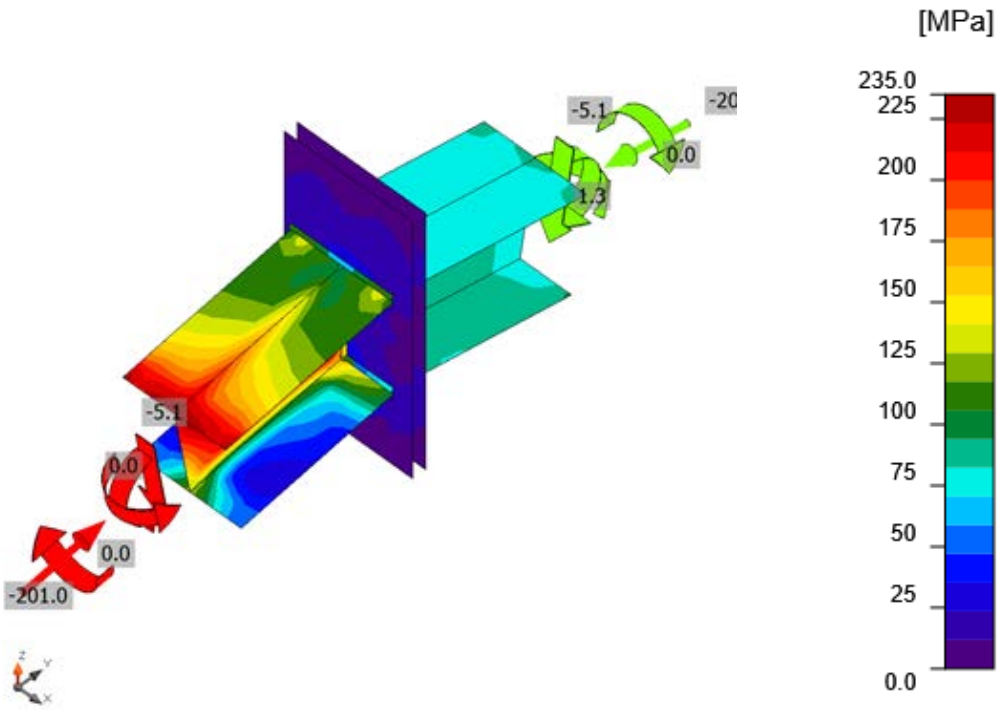


Overall check, ULS-Set(4)



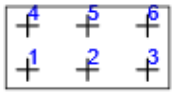
Strain check, ULS-Set(4)

Project:	**Montažni nastavak gornjeg pojasa**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**



Equivalent stress, ULS-Set(4)

Bolts

	Name	Loads	$F_{t,Ed}$ [kN]	V [kN]	Ut_t [%]	$F_{b,Rd}$ [kN]	Ut_s [%]	Ut_{ts} [%]	Status
	B1	ULS-Set(1)	14.1	2.2	12.5	128.0	3.5	12.4	OK
	B2	ULS-Set(1)	27.5	2.5	24.3	172.8	4.0	21.3	OK
	B3	ULS-Set(1)	9.5	2.1	8.4	128.0	3.4	9.4	OK
	B4	ULS-Set(1)	14.0	2.2	12.4	128.0	3.5	12.4	OK
	B5	ULS-Set(1)	27.3	2.5	24.2	172.8	4.0	21.2	OK
	B6	ULS-Set(1)	9.5	2.1	8.4	128.0	3.4	9.4	OK

Design data

Name	$F_{t,Rd}$ [kN]	$B_{p,Rd}$ [kN]	$F_{v,Rd}$ [kN]
M16 10.9 - 1	113.0	230.3	62.8

Symbol explanation

$F_{t,Rd}$	Bolt tension resistance EN 1993-1-8 tab. 3.4
$F_{t,Ed}$	Tension force
$B_{p,Rd}$	Punching shear resistance
V	Resultant of shear forces Vy, Vz in bolt
$F_{v,Rd}$	Bolt shear resistance EN_1993-1-8 table 3.4
$F_{b,Rd}$	Plate bearing resistance EN 1993-1-8 tab. 3.4
Ut_t	Utilization in tension
Ut_s	Utilization in shear
Ut_{ts}	Utilization in tension and shear EN 1993-1-8 table 3.4

Project:	**Montažni nastavak gornjeg pojasa**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

Welds (Plastic redistribution)

Item	Edge	Throat th. [mm]	Length [mm]	Loads	$\sigma_{w,Ed}$ [MPa]	ε_{Pl} [%]	σ_U [MPa]	$\tau_{\parallel}$ [MPa]	τ_U [MPa]	Ut [%]	Ut_c [%]	Status
SP1	B100-bfl 1	◢4.0◣	120	ULS-Set(4)	108.7	0.0	-30.8	-5.8	-59.9	30.2	21.1	OK
		◢4.0◣	120	ULS-Set(4)	169.1	0.0	-107.5	37.8	65.1	47.0	38.9	OK
SP1	B100-tfl 1	◢4.0◣	120	ULS-Set(4)	113.9	0.0	-61.4	-21.1	-51.2	31.7	26.4	OK
		◢4.0◣	120	ULS-Set(4)	151.4	0.0	-63.3	17.6	77.4	42.1	39.0	OK
SP1	B100-w 1	◢4.0◣	108	ULS-Set(4)	155.8	0.0	-62.6	-54.4	-61.9	43.3	33.5	OK
		◢4.0◣	108	ULS-Set(4)	157.8	0.0	-62.3	55.1	63.0	43.8	33.6	OK
SP2	B101-bfl 1	◢4.0◣	120	ULS-Set(4)	146.7	0.0	-67.3	-5.8	-75.0	40.7	33.9	OK
		◢4.0◣	120	ULS-Set(4)	154.3	0.0	-71.3	-2.8	79.0	42.9	39.9	OK
SP2	B101-tfl 1	◢4.0◣	120	ULS-Set(4)	110.5	0.0	-58.2	23.8	-48.7	30.7	26.3	OK
		◢4.0◣	120	ULS-Set(4)	122.8	0.0	-48.2	-16.9	62.9	34.1	31.3	OK
SP2	B101-w 1	◢4.0◣	108	ULS-Set(4)	83.6	0.0	-41.4	7.0	-41.3	23.2	20.6	OK
		◢4.0◣	108	ULS-Set(4)	83.7	0.0	-41.4	-6.9	41.4	23.2	20.6	OK

Design data

	β_w [-]	$\sigma_{w,Rd}$ [MPa]	0.9 σ [MPa]
S 235	0.80	360.0	259.2

Symbol explanation

ε_{Pl}	Strain
$\sigma_{w,Ed}$	Equivalent stress
$\sigma_{w,Rd}$	Equivalent stress resistance
$\sigma_{\perp}$	Perpendicular stress
$\tau_{\parallel}$	Shear stress parallel to weld axis
$\tau_{\perp}$	Shear stress perpendicular to weld axis
0.9 σ	Perpendicular stress resistance - 0.9*fu/γM2
β_w	Corelation factor EN 1993-1-8 tab. 4.1
Ut	Utilization
Utc	Weld capacity utilization

Buckling

Buckling analysis was not calculated.

Project:	**Veza rožnjače i rešetke**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

Material

Steel	S 235, S 275
Concrete	C25/30

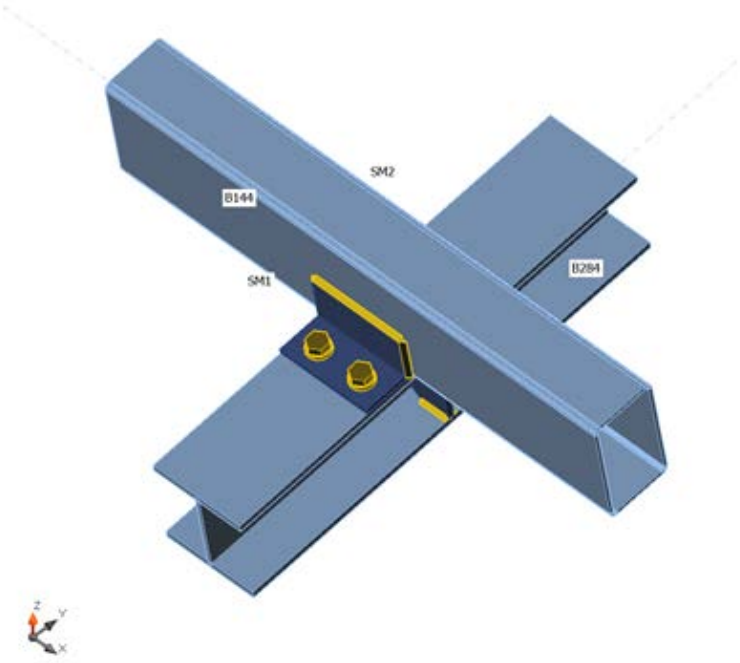
Project item Con N111

Design

Name	Con N111
Description	
Analysis	Stress, strain/ simplified loading

Beams and columns

Name	Cross-section	β – Direction [°]	γ - Pitch [°]	α - Rotation [°]	Offset ex [mm]	Offset ey [mm]	Offset ez [mm]	Forces in
B144	2 - CFRHS140X80X4(RHS140x80)	0.0	0.0	9.9	0	0	127	Position
B284	4 - HEA120	-90.0	9.9	0.0	0	0	0	Position



Cross-sections

Name	Material
2 - CFRHS140X80X4(RHS140x80)	S 235
4 - HEA120	S 275
5 - L60X6	S 235

Project:	**Veza rožnjače i rešetke**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

Bolts

Name	Bolt assembly	Diameter [mm]	fu [MPa]	Gross area [mm^2]
M16 8.8	M16 8.8	16	800.0	201

Load effects (equilibrium not required)

Name	Member	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
ULS-Set(2)	B144	7.5	0.0	-7.4	0.0	-7.8	0.0
	B144	24.7	0.0	-8.7	0.0	7.8	0.0
ULS-Set(4)	B144	-5.0	0.0	6.1	0.0	6.5	0.0
	B144	-19.3	0.0	7.0	0.0	-6.5	0.0
ULS-Set(5)	B144	11.8	0.0	-7.2	0.0	-7.0	0.0
	B144	38.7	0.0	-8.6	0.0	7.0	0.0
ULS-Set(11)	B144	-4.3	0.0	5.7	0.0	6.1	0.0
	B144	-16.6	0.0	6.5	0.0	-6.1	0.0
ULS-Set(15)	B144	5.5	0.0	-3.0	0.0	-2.9	0.0
	B144	16.3	0.0	-3.6	0.0	2.9	0.0
ULS-Set(22)	B144	11.1	0.0	-6.8	0.0	-6.7	0.0
	B144	36.0	0.0	-8.1	0.0	6.7	0.0

Check

Summary

Name	Value	Status
Analysis	100.0%	OK
Plates	2.6 < 5%	OK
Bolts	76.8 < 100%	OK
Welds	98.1 < 100%	OK
Buckling	Not calculated	

Plates

Name	Material	Thickness [mm]	Loads	σ_{Ed} [MPa]	ε_{Pl} [%]	Status
B144	S 235	4.0	ULS-Set(5)	235.1	0.0	OK
B284-bfl 1	S 275	8.0	ULS-Set(5)	142.5	0.0	OK
B284-tfl 1	S 275	8.0	ULS-Set(5)	280.4	2.6	OK
B284-w 1	S 275	5.0	ULS-Set(5)	275.6	0.3	OK
SM1-bfl 1	S 235	6.0	ULS-Set(5)	236.7	0.8	OK
SM1-w 1	S 235	6.0	ULS-Set(5)	236.0	0.5	OK
SM2-bfl 1	S 235	6.0	ULS-Set(5)	236.7	0.8	OK
SM2-w 1	S 235	6.0	ULS-Set(5)	236.0	0.5	OK
STIFF1a	S 235	8.0	ULS-Set(5)	160.3	0.0	OK
STIFF1b	S 235	8.0	ULS-Set(5)	111.1	0.0	OK

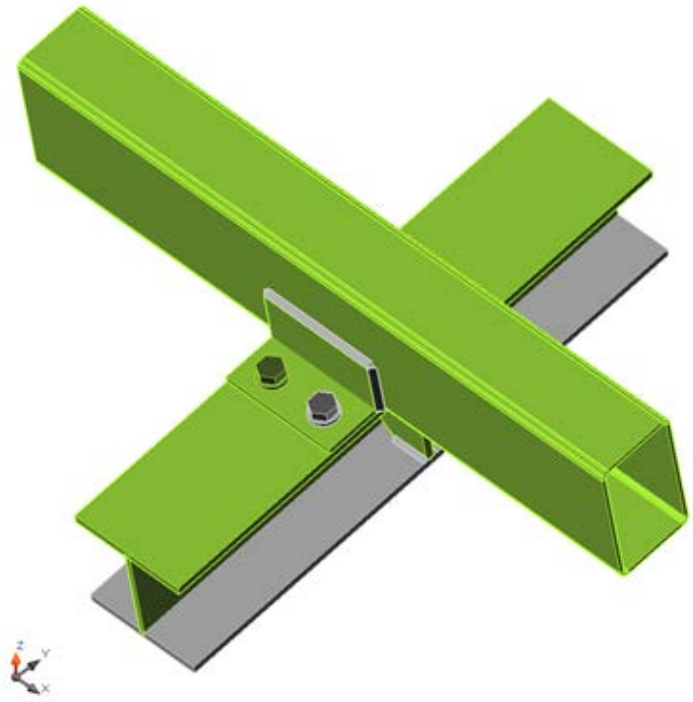
Project:	**Veza rožnjače i rešetke**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

Design data

Material	f_y [MPa]	ε_{lim} [%]
S 235	235.0	5.0
S 275	275.0	5.0

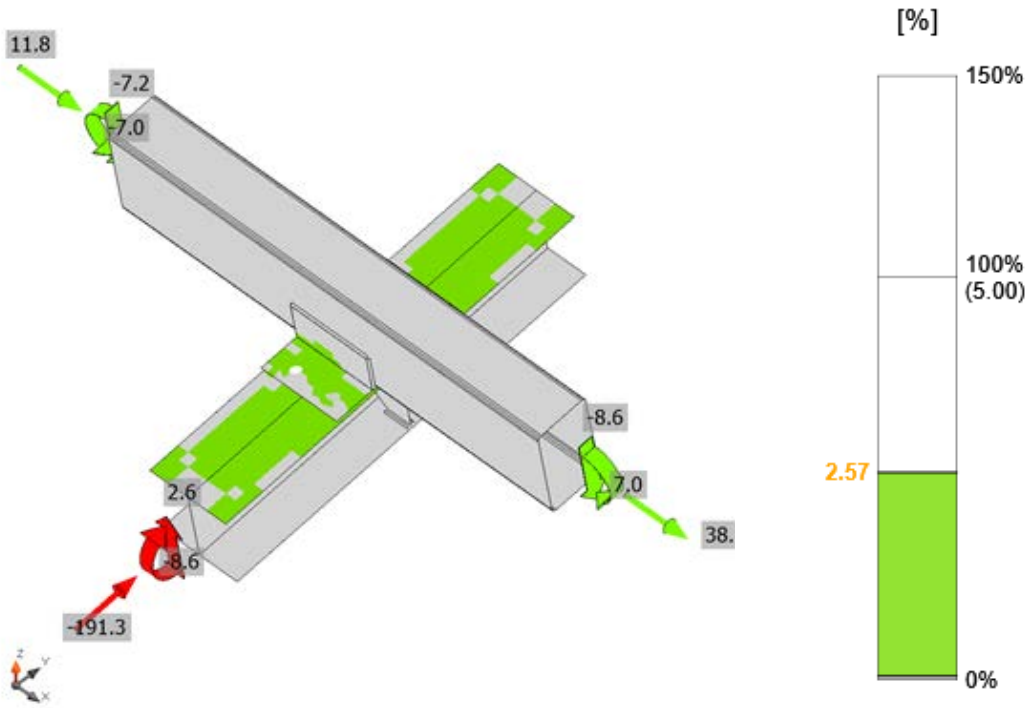
Symbol explanation

ε_{Pl}	Strain
σ_{Ed}	Eq. stress
f_y	Yield strength
ε_{lim}	Limit of plastic strain

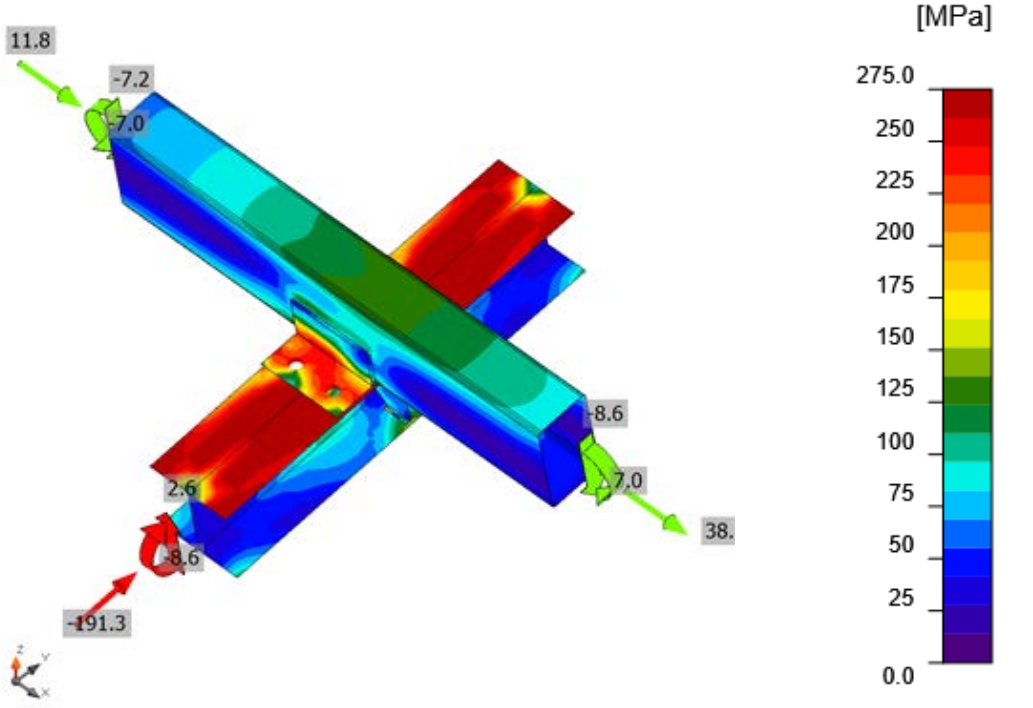


Overall check, ULS-Set(5)

Project:	**Veza rožnjače i rešetke**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**



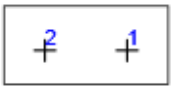
Strain check, ULS-Set(5)



Equivalent stress, ULS-Set(5)

Project:	**Veza rožnjače i rešetke**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

Bolts

	Name	Loads	$F_{t,Ed}$ [kN]	V [kN]	Ut_t [%]	$F_{b,Rd}$ [kN]	Ut_s [%]	Ut_{ts} [%]	Status
	B1	ULS-Set(4)	37.9	6.0	46.5	32.6	18.4	39.8	OK
	B2	ULS-Set(5)	62.2	13.5	76.4	32.7	41.3	71.5	OK
	B3	ULS-Set(4)	38.0	6.0	46.7	32.6	18.3	39.9	OK
	B4	ULS-Set(5)	62.6	13.5	76.8	32.7	41.3	71.8	OK

Design data

Name	$F_{t,Rd}$ [kN]	$B_{p,Rd}$ [kN]	$F_{v,Rd}$ [kN]
M16 8.8 - 1	90.4	81.4	60.3

Symbol explanation

$F_{t,Rd}$	Bolt tension resistance EN 1993-1-8 tab. 3.4
$F_{t,Ed}$	Tension force
$B_{p,Rd}$	Punching shear resistance
V	Resultant of shear forces Vy, Vz in bolt
$F_{v,Rd}$	Bolt shear resistance EN_1993-1-8 table 3.4
$F_{b,Rd}$	Plate bearing resistance EN 1993-1-8 tab. 3.4
Ut_t	Utilization in tension
Ut_s	Utilization in shear
Ut_{ts}	Utilization in tension and shear EN 1993-1-8 table 3.4

Project:	**Veza rožnjače i rešetke**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

Welds (Plastic redistribution)

Item	Edge	Throat th. [mm]	Length [mm]	Loads	$\sigma_{w,Ed}$ [MPa]	ε_{Pl} [%]	σ_{U} [MPa]	$\tau_{\parallel}$ [MPa]	τ_{U} [MPa]	Ut [%]	Ut_c [%]	Status
B284-bfl 1	STIFF1a	◢3.0◣	37	ULS-Set(5)	197.5	0.0	-17.0	-112.3	-17.1	54.9	29.3	OK
		◢3.0◣	37	ULS-Set(5)	198.7	0.0	-17.4	113.0	17.2	55.2	29.7	OK
B284-w 1	STIFF1a	◢3.0◣	56	ULS-Set(5)	206.4	0.0	7.0	118.9	7.0	57.3	41.5	OK
		◢3.0◣	56	ULS-Set(5)	207.0	0.0	6.7	-119.2	-6.7	57.5	41.3	OK
B284-tfl 1	STIFF1a	◢3.0◣	37	ULS-Set(5)	353.2	0.3	-159.7	-148.6	-104.9	98.1	77.4	OK
		◢3.0◣	37	ULS-Set(5)	353.2	0.2	-68.5	153.7	128.0	98.1	79.7	OK
B284-bfl 1	STIFF1b	◢3.0◣	36	ULS-Set(5)	142.3	0.0	4.7	82.0	4.7	39.5	23.5	OK
		◢3.0◣	36	ULS-Set(5)	142.8	0.0	4.8	-82.2	-4.8	39.7	23.7	OK
B284-w 1	STIFF1b	◢3.0◣	56	ULS-Set(5)	150.1	0.0	-20.5	-83.4	-20.6	41.7	30.5	OK
		◢3.0◣	56	ULS-Set(5)	149.9	0.0	-20.3	83.4	20.2	41.7	30.3	OK
B284-tfl 1	STIFF1b	◢3.0◣	36	ULS-Set(5)	284.2	0.0	137.7	88.1	113.3	78.9	49.5	OK
		◢3.0◣	36	ULS-Set(5)	300.1	0.0	98.4	-108.7	-122.4	83.4	53.5	OK
B144-w 4	SM1-w 1	◢4.0	120	ULS-Set(5)	85.2	0.0	-4.9	49.1	-0.6	23.7	17.7	OK
B144-w 4	SM1-w 1	◢4.0	120	ULS-Set(5)	221.8	0.0	109.4	-61.6	92.8	61.6	23.5	OK
B144-w 4	SM1-w 1	◢4.0	57	ULS-Set(5)	150.6	0.0	0.9	-68.0	-54.2	41.8	18.6	OK
B144-w 4	SM1-w 1	◢4.0	57	ULS-Set(5)	122.5	0.0	-8.1	57.2	-41.3	34.0	19.4	OK
B144-w 2	SM2-w 1	◢4.0	120	ULS-Set(5)	85.5	0.0	-4.9	49.3	0.6	23.7	17.7	OK
B144-w 2	SM2-w 1	◢4.0	120	ULS-Set(5)	220.1	0.0	108.1	-61.0	-92.3	61.1	23.4	OK
B144-w 2	SM2-w 1	◢4.0	57	ULS-Set(5)	150.3	0.0	1.1	-68.1	53.8	41.8	18.7	OK
B144-w 2	SM2-w 1	◢4.0	57	ULS-Set(5)	120.3	0.0	-8.0	56.1	40.8	33.4	19.5	OK

Design data

	β_w [-]	$\sigma_{w,Rd}$ [MPa]	0.9 σ [MPa]
S 235	0.80	360.0	259.2

Symbol explanation

ε_{Pl}	Strain
$\sigma_{w,Ed}$	Equivalent stress
$\sigma_{w,Rd}$	Equivalent stress resistance
$\sigma_{\perp}$	Perpendicular stress
$\tau_{\parallel}$	Shear stress parallel to weld axis
$\tau_{\perp}$	Shear stress perpendicular to weld axis
0.9 σ	Perpendicular stress resistance - 0.9*fu/γM2
β_w	Corelation factor EN 1993-1-8 tab. 4.1
Ut	Utilization
Utc	Weld capacity utilization

Buckling

Buckling analysis was not calculated.

Project:	**Montažni nastavak rožnjače**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

Material

Steel	S 235

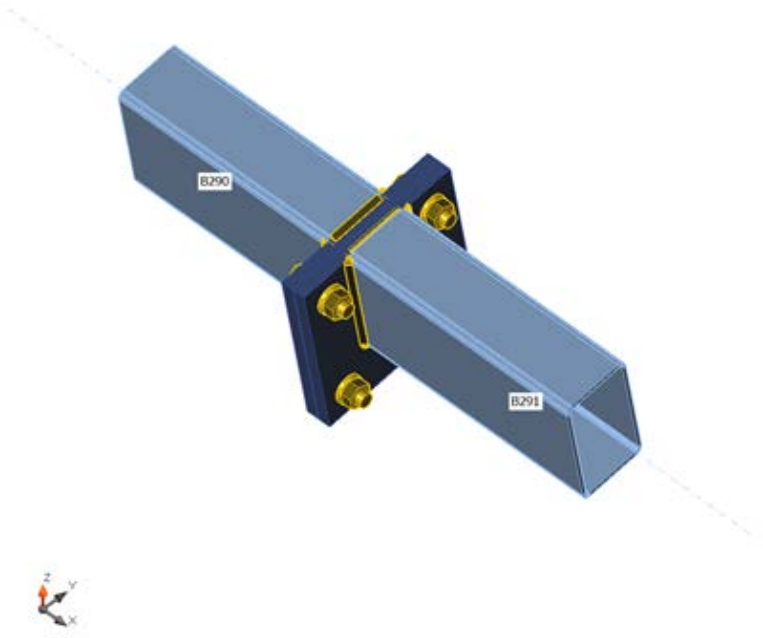
Project item Con N265

Design

Name	Con N265
Description	
Analysis	Stress, strain/ loads in equilibrium

Beams and columns

Name	Cross-section	β – Direction [°]	γ - Pitch [°]	α - Rotation [°]	Offset ex [mm]	Offset ey [mm]	Offset ez [mm]	Forces in
B290	1 - CFRHS140X80X4(RHS140x80)	180.0	0.0	-9.9	15	0	0	Position
B291	1 - CFRHS140X80X4(RHS140x80)	0.0	0.0	9.9	15	0	0	Position



Cross-sections

Name	Material
1 - CFRHS140X80X4(RHS140x80)	S 235

Project:	**Montažni nastavak rožnjače**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

Bolts

Name	Bolt assembly	Diameter [mm]	fu [MPa]	Gross area [mm^2]
M16 10.9	M16 10.9	16	1000.0	201

Project:	**Montažni nastavak rožnjače**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

Load effects (forces in equilibrium)

Name	Member	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
ULS-Set(1)	B290	3.7	-0.1	-3.9	0.0	-1.1	0.0
	B291	3.7	-0.1	3.9	0.0	-1.1	0.0
ULS-Set(2)	B290	-8.3	-0.8	4.7	0.0	1.3	0.2
	B291	-8.3	-0.8	-4.7	0.0	1.3	-0.2
Sy(3)	B290	0.0	0.0	0.0	0.0	0.0	0.0
	B291	0.0	0.0	0.0	0.0	0.0	0.0
ULS-Seis(4)	B290	-1.5	-0.1	0.7	0.0	0.2	0.0
	B291	-1.5	-0.1	-0.7	0.0	0.2	0.0
Sx(5)	B290	0.0	0.0	0.0	0.0	0.0	0.0
	B291	0.0	0.0	0.0	0.0	0.0	0.0
Sx(6)	B290	0.0	0.0	0.0	0.0	0.0	0.0
	B291	0.0	0.0	0.0	0.0	0.0	0.0
ULS-Seis(7)	B290	-1.5	-0.1	0.7	0.0	0.2	0.0
	B291	-1.5	-0.1	-0.7	0.0	0.2	0.0
Sy(8)	B290	0.0	0.0	0.0	0.0	0.0	0.0
	B291	0.0	0.0	0.0	0.0	0.0	0.0
ULS-Set(9)	B290	-6.7	-0.8	4.7	0.0	1.3	0.2
	B291	-6.7	-0.8	-4.7	0.0	1.3	-0.2
ULS-Set(10)	B290	-5.1	-0.8	4.6	0.0	1.3	0.2
	B291	-5.1	-0.8	-4.6	0.0	1.3	-0.2
ULS-Set(11)	B290	-6.7	-0.5	2.9	0.0	0.8	0.1
	B291	-6.7	-0.5	-2.9	0.0	0.8	-0.1
ULS-Set(12)	B290	0.9	-0.1	-3.8	0.0	-1.0	0.0
	B291	0.9	-0.1	3.8	0.0	-1.0	0.0
ULS-Set(13)	B290	-3.7	-0.8	1.9	0.0	0.5	0.2
	B291	-3.7	-0.8	-1.9	0.0	0.5	-0.2
Sy(14)	B290	0.0	0.0	0.0	0.0	0.0	0.0
	B291	0.0	0.0	0.0	0.0	0.0	0.0
Sy(15)	B290	0.0	0.0	0.0	0.0	0.0	0.0
	B291	0.0	0.0	0.0	0.0	0.0	0.0
Sy(16)	B290	0.0	0.0	0.0	0.0	0.0	0.0
	B291	0.0	0.0	0.0	0.0	0.0	0.0
ULS-Set(17)	B290	1.3	-0.4	-2.0	0.0	-0.6	0.1
	B291	1.3	-0.4	2.0	0.0	-0.6	-0.1
ULS-Set(18)	B290	-2.0	-0.3	-2.6	0.0	-0.7	0.1
	B291	-2.0	-0.3	2.6	0.0	-0.7	-0.1
ULS-Set(19)	B290	-2.0	-0.2	1.0	0.0	0.3	0.0
	B291	-2.0	-0.2	-1.0	0.0	0.3	0.0
ULS-Set(20)	B290	-1.1	-0.4	2.5	0.0	0.7	0.1
	B291	-1.1	-0.4	-2.5	0.0	0.7	-0.1
ULS-Set(21)	B290	-6.9	-0.8	1.9	0.0	0.5	0.2
	B291	-6.9	-0.8	-1.9	0.0	0.5	-0.2

Project:	**Montažni nastavak rožnjače**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

Name	Member	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
ULS-Set(22)	B290	-4.6	-0.8	4.4	0.0	1.2	0.2
	B291	-4.6	-0.8	-4.4	0.0	1.2	-0.2

Check

Summary

Name	Value	Status
Analysis	100.0%	OK
Plates	0.0 < 5%	OK
Bolts	7.2 < 100%	OK
Welds	28.1 < 100%	OK
Buckling	Not calculated	
GMNA	Calculated	

Plates

Name	Thickness [mm]	Loads	σ_{Ed} [MPa]	ε_{Pl} [%]	Status
B290	4.0	ULS-Set(2)	72.3	0.0	OK
B291	4.0	ULS-Set(2)	64.7	0.0	OK
PP1a	15.0	ULS-Set(10)	41.0	0.0	OK
PP1b	15.0	ULS-Set(10)	39.6	0.0	OK

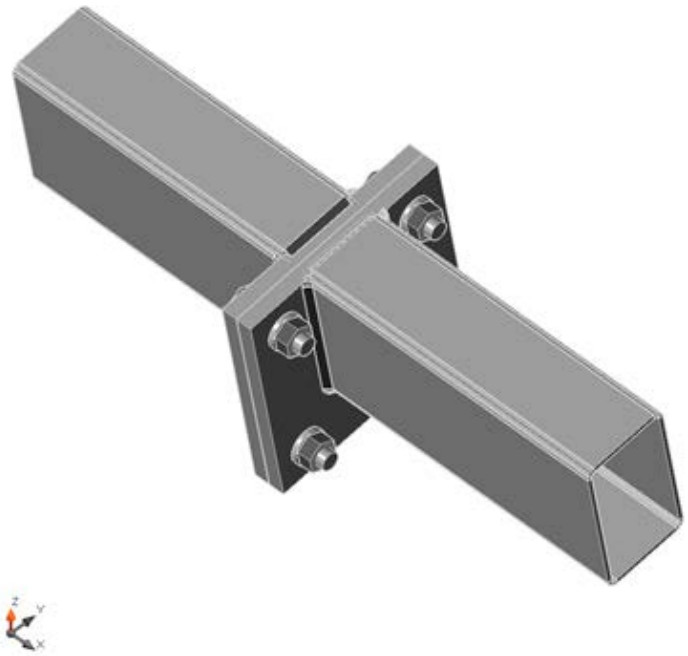
Design data

Material	f_y [MPa]	ε_{lim} [%]
S 235	235.0	5.0

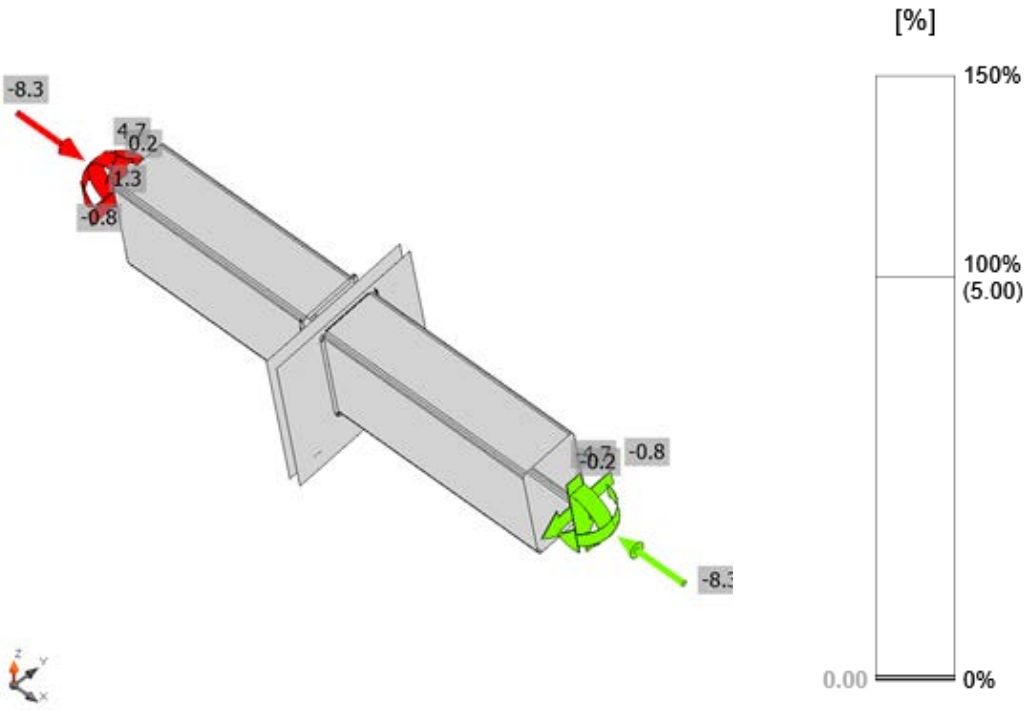
Symbol explanation

ε_{Pl}	Strain
σ_{Ed}	Eq. stress
f_y	Yield strength
ε_{lim}	Limit of plastic strain

Project:	**Montažni nastavak rožnjače**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

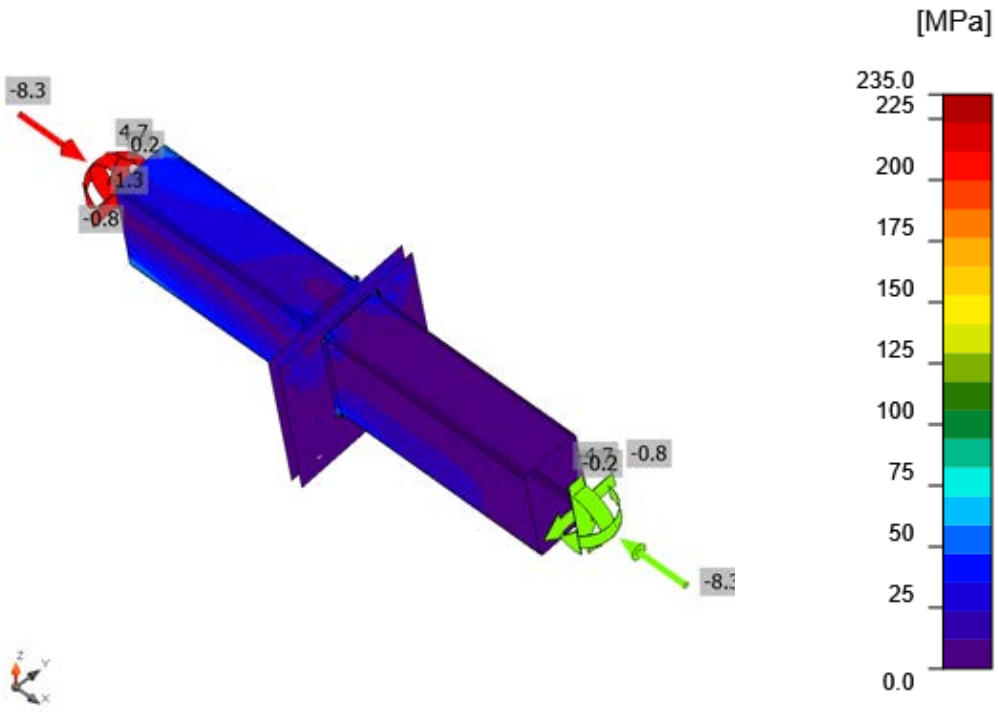


Overall check, ULS-Set(2)



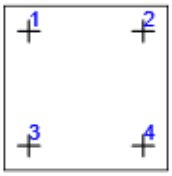
Strain check, ULS-Set(2)

Project:	**Montažni nastavak rožnjače**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**



Equivalent stress, ULS-Set(2)

Bolts

	Name	Loads	$F_{t,Ed}$ [kN]	V [kN]	Ut_t [%]	$F_{b,Rd}$ [kN]	Ut_s [%]	Ut_{ts} [%]	Status
	B1	ULS-Set(10)	8.2	1.2	7.2	101.6	1.9	7.0	OK
	B2	ULS-Set(10)	6.1	1.3	5.4	101.2	2.0	5.9	OK
	B3	ULS-Set(1)	6.5	0.9	5.8	96.0	1.5	5.6	OK
	B4	ULS-Set(1)	6.4	0.9	5.6	96.0	1.5	5.5	OK

Design data

Name	$F_{t,Rd}$ [kN]	$B_{p,Rd}$ [kN]	$F_{v,Rd}$ [kN]
M16 10.9 - 1	113.0	230.3	62.8

Symbol explanation

$F_{t,Rd}$	Bolt tension resistance EN 1993-1-8 tab. 3.4
$F_{t,Ed}$	Tension force
$B_{p,Rd}$	Punching shear resistance
V	Resultant of shear forces Vy, Vz in bolt
$F_{v,Rd}$	Bolt shear resistance EN_1993-1-8 table 3.4
$F_{b,Rd}$	Plate bearing resistance EN 1993-1-8 tab. 3.4
Ut_t	Utilization in tension
Ut_s	Utilization in shear
Ut_{ts}	Utilization in tension and shear EN 1993-1-8 table 3.4

Project:	**Montažni nastavak rožnjače**
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Author:	**Imre Kekenj, mast.inž.građ.**

Welds (Plastic redistribution)

Item	Edge	Throat th. [mm]	Length [mm]	Loads	$\sigma_{w,Ed}$ [MPa]	ε_{Pl} [%]	σ_U [MPa]	$\tau_{\parallel}$ [MPa]	τ_U [MPa]	Ut [%]	Ut_c [%]	Status
PP1a	B290	◢4.0	404	ULS-Set(10)	101.0	0.0	45.3	-46.8	-23.0	28.1	8.4	OK
PP1b	B291	◢4.0	404	ULS-Set(1)	97.8	0.0	62.4	31.0	-30.5	27.2	5.0	OK

Design data

	β_w [-]	$\sigma_{w,Rd}$ [MPa]	0.9 σ [MPa]
S 235	0.80	360.0	259.2

Symbol explanation

ε_{Pl}	Strain
$\sigma_{w,Ed}$	Equivalent stress
$\sigma_{w,Rd}$	Equivalent stress resistance
$\sigma_{\perp}$	Perpendicular stress
$\tau_{\parallel}$	Shear stress parallel to weld axis
$\tau_{\perp}$	Shear stress perpendicular to weld axis
0.9 σ	Perpendicular stress resistance - 0.9*fu/γM2
β_w	Corelation factor EN 1993-1-8 tab. 4.1
Ut	Utilization
Utc	Weld capacity utilization

Buckling

Buckling analysis was not calculated.

Zglobna veza sa zavrtnjima - kategorija spoja: A, D i AD

Veza krovnog sprega 60x3

Merodavni uticaji:

N=	0.000	kN
T2=	32.390	kN
T3=	0.000	kN
T=	32.390	kN

Upotrebljeni vijci:
2 M 12 k.č. 8.8
SRPS EN 15048-1/15048-2
EN ISO 4014 (DIN931)

Zadovoljava

Uticaji za 1 vijak:

N=	0.000	kN	sila zatezanja
T2=	16.195	kN	
T3=	0.000	kN	
T=	16.195	kN	sila smicanja

1. Nosivost zavrtnjeva u smičućim spojevima:

1.1. Nosivost zavrtnja na smicanje

Prečnik zavrtnja:	d =	1.2	cm	
Prečnik rupe:	d_0 =	1.3	cm	
Površina preseka zavrtnja:	$A = d^2\pi/4$ =	1.131	cm²	
Površina ispitnog preseka:	A_s =	0.843	cm²	primeniti kad je navoj u paketu!
Sečnost zavrtnja:	m =	1		
	α_v =	0.6		→ tabela 3.4
zavisno od materijala zavrtnja:	f_{ub} =	80	kN/cm²	→ tabela 3.1
zavisno od materijala osnovnog mat.:	f_u =	36	kN/cm²	
zavisno od materijala osnovnog mat.:	f_y =	23.5	kN/cm²	
	γ_{M2} =	1.25		
	γ_{M0} =	1		

Nosivost vijka na smicanje:

$F_{v,Rd} = (m * \alpha_v * f_{ub} * A) / \gamma_{M2}$ = 32.371 kN

1.2. Nosivost zavrtnja na pritisak po omotaču rupe:

Debljina paketa lima:	Σt=	0.8	cm
Rastojanje između vijaka:			
Krajnje rastojanje - u pravcu sile	e_1 =	35	mm
Ivično rastojanje - upravno na sil	e_2 =	25	mm
Razmak - u pravcu sile	p_1 =	60	mm
Razmak - upravno na silu	p_2 =	40	mm

ivični red k_1 je manji od:

$k_1 = 2.8*(e_2/d_0) - 1.7$ → k_1 = 52.146

k1 = 2.5 → k_1 = 2.5 → k_1 = 2.500

unutrašnji red k_1 je manji od:

$k_1 = 1.4*(p_2/d_0) - 1.7$ → k_1 = 41.377

k1 = 2.5 → k_1 = 2.5 → k_1 = 2.500

usvojeno za proračun → k_1 = 2.500

α_b je manji od: α_d, f_{ub} / f_u, 1

krajnji red: $\alpha_d = e_1 / 3d_0$ = 8.974

unutrašnji red: $\alpha_d = (p_1 / 3d_0) - 1/4$ = 15.135

f_{ub} / f_u = 2.222

α_b = 1

usvojeno za proračun → α_b = 1.000

Nosivost vijka na pritisak po omotaču rupe:

$F_{b,rd} = (k_1 * \alpha_b * f_u * d * t) / \gamma_{M2} =$ 69.120 kN

Merodavna nosivost na smicanje:

$F_{v,rd} =$ 32.371 kN

2. Nosivost zavrtnjeva u zatežućim spojevima:

2.1. Nosivost zavrtnja na zatezanje:

Površina ispitnog preseka: $A_s =$ 0.843 cm²

$k_2 =$ 0.900

Nosivost vijka na zatezanje:

$F_{t,rd} = (k_2 * f_{ub} * A_s) / \gamma_{M2} =$ 48.5568 kN

2.2. Nosivost na probijanje smicanjem:

Prečnik ispod glave vijka: $d_m =$ 2.050 cm → tabela 6.1

Najmanja debljina lima: $t_p =$ 0.8 cm

Nosivost na probijanje smicanjem:

$B_{p,Rd} = (0.6 * \pi * d_m * t_p * f_u) / \gamma_{M2} =$ 89.0302 kN

Merodavna nosivost na zatezanje:

$F_{t,rd} =$ 48.557 kN

3. Kombinovano naprezanje:

$(F_{v,Ed} / F_{v,Rd}) + (F_{t,Ed} / (1.4*F_{t,Rd})) \leq 1$

$(F_{v,Ed} / F_{v,Rd}) + (F_{t,Ed} / (1.4*F_{t,Rd})) =$ 0.500 ≤1

Izabrani vijak: Zadovoljava

Usvojeno: 2 M 12 k.č. 8.8

SRPS EN 15048-1/15048-2

EN ISO 4014 (DIN931)

4. Uticaj dugačke veze:

Ne $L_j =$ 60 mm > 15*d = 180 mm

$\beta_{Lf} = 1 - ((L_j - 15*d) / (200*d)) =$ 1.500 !!! 0.75 ≤ βLf ≤ 1

$\beta_{Lf} =$ 1.000

Merodavna nosivost na smicanje:

$F_{v,Rd} * \beta_{Lf} =$ 32.371

5. Kombinovano naprezanje dugačke veze:

$(F_{v,Ed} / F_{v,Rd}) + (F_{t,Ed} / (1.4*F_{t,Rd})) \leq 1$

$(F_{v,Ed} / F_{v,Rd}) + (F_{t,Ed} / (1.4*F_{t,Rd})) =$ 0.500 ≤1

Izabrani vijak: Zadovoljava

Usvojeno: 2 M 12 k.č. 8.8

SRPS EN 15048-1/15048-2

EN ISO 4014 (DIN931)

6. Cepanje bloka za simetrične grupe zavrtnjeva

Neto površina izložena zatezanju: A_{nt} = 2.080 cm²

Neto površina izložena smicanju: A_{nv} = 4.480 cm²

$V_{eff,1,Rd} = ((f_u * A_{nt}) / \gamma_{M2}) + ((1/\sqrt{3}) * f_y * A_{nv} / \gamma_{M0})$ = 120.687 kN

Presek JE OTPORAN na cepanje bloka

7. Zavarivanje

Sve elemente sklopa međusobno zavariti 100%. Debljina svih neobeleženih ugaonih šavova iznosi aw=0,7tmin (70% najtanjeg elementa u vezi), osim kod veza šupljih profila kod kojih je aw=tmin (debljina lima profila).

Zglobna veza sa zavrtnjima - kategorija spoja: A, D i AD

Veza kosnika 80x3

Merodavni uticaji:

N=	0.000	kN
T2=	17.000	kN
T3=	0.000	kN
T=	17.000	kN

Upotrebljeni vijci:
2 M 12 k.č. 8.8
SRPS EN 15048-1/15048-2
EN ISO 4014 (DIN931)

Zadovoljava

Uticaji za 1 vijak:

N=	0.000	kN	sila zatezanja
T2=	8.500	kN	
T3=	0.000	kN	
T=	8.500	kN	sila smicanja

1. Nosivost zavrtnjeva u smičućim spojevima:

1.1. Nosivost zavrtnja na smicanje

Prečnik zavrtnja:	d =	1.2	cm	
Prečnik rupe:	d_0 =	1.3	cm	
Površina preseka zavrtnja:	$A = d^2\pi/4$ =	1.131	cm²	
Površina ispitnog preseka:	A_s =	0.843	cm²	primeniti kad je navoj u paketu!
Sečnost zavrtnja:	m =	1		
	α_v =	0.6		→ tabela 3.4
zavisno od materijala zavrtnja:	f_{ub} =	80	kN/cm²	→ tabela 3.1
zavisno od materijala osnovnog mat.:	f_u =	36	kN/cm²	
zavisno od materijala osnovnog mat.:	f_y =	23.5	kN/cm²	
	γ_{M2} =	1.25		
	γ_{M0} =	1		

Nosivost vijka na smicanje:

$F_{v,Rd} = (m * \alpha_v * f_{ub} * A) / \gamma_{M2}$ = 32.371 kN

1.2. Nosivost zavrtnja na pritisak po omotaču rupe:

Debljina paketa lima:	Σt=	0.8	cm
Rastojanje između vijaka:			
Krajnje rastojanje - u pravcu sile	e_1 =	35	mm
Ivično rastojanje - upravno na sil	e_2 =	25	mm
Razmak - u pravcu sile	p_1 =	60	mm
Razmak - upravno na silu	p_2 =	40	mm

ivični red k_1 je manji od:

$k_1 = 2.8*(e_2/d_0) - 1.7$ → k_1 = 52.146

k1 = 2.5 → k_1 = 2.5 → k_1 = 2.500

unutrašnji red k_1 je manji od:

$k_1 = 1.4*(p_2/d_0) - 1.7$ → k_1 = 41.377

k1 = 2.5 → k_1 = 2.5 → k_1 = 2.500

usvojeno za proračun → k_1 = 2.500

α_b je manji od: α_d, f_{ub} / f_u, 1

krajnji red: $\alpha_d = e_1 / 3d_0$ = 8.974

unutrašnji red: $\alpha_d = (p_1 / 3d_0) - 1/4$ = 15.135

f_{ub} / f_u = 2.222

α_b = 1

usvojeno za proračun → α_b = 1.000

Nosivost vijka na pritisak po omotaču rupe:

$F_{b,rd} = (k_1 * \alpha_b * f_u * d * t) / \gamma_{M2} =$ 69.120 kN

Merodavna nosivost na smicanje:

$F_{v,rd} =$ 32.371 kN

2. Nosivost zavrtnjeva u zatežućim spojevima:

2.1. Nosivost zavrtnja na zatezanje:

Površina ispitnog preseka: $A_s =$ 0.843 cm²

$k_2 =$ 0.900

Nosivost vijka na zatezanje:

$F_{t,rd} = (k_2 * f_{ub} * A_s) / \gamma_{M2} =$ 48.5568 kN

2.2. Nosivost na probijanje smicanjem:

Prečnik ispod glave vijka: $d_m =$ 2.050 cm → tabela 6.1

Najmanja debljina lima: $t_p =$ 0.8 cm

Nosivost na probijanje smicanjem:

$B_{p,Rd} = (0.6 * \pi * d_m * t_p * f_u) / \gamma_{M2} =$ 89.0302 kN

Merodavna nosivost na zatezanje:

$F_{t,rd} =$ 48.557 kN

3. Kombinovano naprezanje:

$(F_{v,Ed} / F_{v,Rd}) + (F_{t,Ed} / (1.4*F_{t,Rd})) \leq 1$

$(F_{v,Ed} / F_{v,Rd}) + (F_{t,Ed} / (1.4*F_{t,Rd})) =$ 0.263 ≤1

Izabrani vijak: Zadovoljava

Usvojeno: 2 M 12 k.č. 8.8

SRPS EN 15048-1/15048-2

EN ISO 4014 (DIN931)

4. Uticaj dugačke veze:

Ne $L_j =$ 60 mm > 15*d = 180 mm

$\beta_{Lf} = 1 - ((L_j - 15*d) / (200*d)) =$ 1.500 !!! $0.75 \leq \beta Lf \leq 1$

$\beta_{Lf} =$ 1.000

Merodavna nosivost na smicanje:

$F_{v,Rd} * \beta_{Lf} =$ 32.371

5. Kombinovano naprezanje dugačke veze:

$(F_{v,Ed} / F_{v,Rd}) + (F_{t,Ed} / (1.4*F_{t,Rd})) \leq 1$

$(F_{v,Ed} / F_{v,Rd}) + (F_{t,Ed} / (1.4*F_{t,Rd})) =$ 0.263 ≤1

Izabrani vijak: Zadovoljava

Usvojeno: 2 M 12 k.č. 8.8

SRPS EN 15048-1/15048-2

EN ISO 4014 (DIN931)

6. Cepanje bloka za simetrične grupe zavrtnjeva

Neto površina izložena zatezanju: A_{nt} = 2.080 cm²

Neto površina izložena smicanju: A_{nv} = 4.480 cm²

$V_{eff,1,Rd} = ((f_u * A_{nt}) / \gamma_{M2}) + ((1/\sqrt{3}) * f_y * A_{nv} / \gamma_{M0})$ = 120.687 kN

Presek JE OTPORAN na cepanje bloka

7. Zavarivanje

Sve elemente sklopa međusobno zavariti 100%. Debljina svih neobeleženih ugaonih šavova iznosi aw=0,7tmin (70% najtanjeg elementa u vezi), osim kod veza šupljih profila kod kojih je aw=tmin (debljina lima profila).

Biro za projektovanje i inženjering
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2.6.2. STATIČKI PRORAČUN – BARAKE

ANALIZA OPTEREĆENJA - Kancelarije, spavaonice, sanitarni blok i kuhinja

1. Stalno opterećenje:

1.1.	Sopstvena težina konstrukcije - uzeto u obzir direktno kroz program			
1.2.	Krovni pokrivač - čelični trapezni lim TR40/245/0.5mm	0.06	kN/m²	INM Arilje
1.3.	Instalacije	0.10	kN/m²	
1.4.	Sendvič paneli d=100mm	0.11	kN/m²	

2. Korisno opterećenje:

2.1.	Korisno opterećenje na krovu → kategorija H	p=	0.40	kN/m²

3. Povremeno opterećenje - sneg

	Sneg na tlu	s_k=	1.00	kN/m²
3.1.	Sneg na krovu $\alpha_1 = \alpha_2 = 8°$	μ_2 =	0.80	
		$s = \mu_2 \times s_k$=	0.80	kN/m²

Proračunske situacije:

1 -	ravnomerno opterećenje snegom	μ_2 i $\mu_2 \times s_k$
2 -	neravnomerno opterećena leva strana	μ_2 i $0.5 \times \mu_2 \times s_k$
3 -	neravnomerno opterećena desna strana	$0.5 \times \mu_2$ i $\mu_2 \times s_k$

4. Vetar - (prema SRPS EN 1991-1-4) i odgovarajući NA — input

Ulazni podaci:

- Lokacija: Bačka Topola - met.stanica Subotica
- Fundamentalna osnovna brzina vetra: $v_{b,0}$ = 19 m/s
- Visina objekta iznad terena: z = 4.00 m
- C prob(T=50 god.) = 1,0 → $v_{b,0} \times C_{prob}$ = $v_{b,0}$ = 19.00 m/s
- Kategorija terena je II. prema tabeli 4.1 →

$z_{0,II}$ - za kat. terena II	0.05
z_{min} - minimalna visina	2.00
$z_{0,II}$ - za kat. terena II	0.05

Osnovna brzina vetra na 10m od tla: $v_b = C_{dir} * C_{season} * v_{b,0}$ = 19.00 m/s

C_{dir} = 1; C_{season} = 1 → $v_b = v_{b,0}$

Srednja (prosečna) brzina vetra: $v_{m(z)} = C_{r(z)} * C_{o(z)} * v_b$ = 13.32 m/s

- $C_{r(z)}$ - koef. hrapavosti terena: $C_{r(z)} = k_r * \ln(z/z_0)$ za $z_{min} < z \le z_{max}$ = 200m
  $C_{r(z)} = C_{r(z\,min)} = k_r * \ln(z_{min} / z_0)$ za $z \le z_{min}$
  z = 4.00 m > z_{min} → $C_{r(z)}$ = 0.701
  - koeficijent terena - $k_r = 0.19 * (z_0/z_{0,II})^{0.07}$ = k_r = 0.190
  - $C_{0(z)}$ - koeficijent topografije terena: prema aneksu A.3 → $C_{0(z)}$ = 1.00

Pritisak vetra:

- q_b - Osnovni pritisak vetra: $q_b = 1/2 * \rho * v_b^2$ = 0.226 kN/m²
- ρ - Gustina vazduha: ρ = 1.250 kg/m³
- $q_{p(z)}$ - Udarni pritisak vetra: $q_{p(z)} = [1+7*I_{v(z)}]*1/2 * \rho * v_{m(z)}^2 = C_{e(z)} * q_b$ = 0.321 kN/m² - za z_{min}
- $C_{e(z)}$ - Koeficijent izloženosti:
  $C_{e(z)} = [1+(7*k_I / C_{0(z)} * \ln(z/z_0))] * k_r^2 * \ln^2(z/z_0) * C_{0(z)}^2$ = za z_{min}
- $I_{v(z)}$ - Intenzitet turbulencije: $I_{v(z)} = \sigma_v / v_{m(z)}$ za $z_{min} < z \le z_{max}$
  $I_{v(z)} = I_{v(zmin)}$ za $z \le z_{min}$
  z = 4.00 m > z_{min} → $I_{v(z)} = \sigma_v / v_{m(z)}$ = 0.271 za z_{min}
  - σ_v - Standardna devijacija vetra: $\sigma_v = k_r * v_b * k_I$ = 3.610
  - k_I - koeficijent turbulencije: k_I = 1

Referentne visine iznad terena:	z [m]	$C_{r(z)}$	$v_{m(z)}$ [m/s]	$I_{v(z)}$	$q_{p(z)}$ [kN/m2]
	2.70	0.758	14.400	0.251	0.357
	4.00	0.833	15.819	0.228	0.406

Koeficijenti spoljašnjeg i unutrašnjeg pritiska vetra $C_{p,e}$, $C_{p,i}$, $C_{p,net}$ sa odgovarajućim pritiscima:

4.1. Uticaj vetra - upravno na sleme, nadstrešnica na zavetrenoj strani

Dimenzije objekta: širina b=25.20m; visina h=4.00m; h < b

4.1.1. Koeficijenti spoljašnjeg pritiska vetra na zidove prema tabeli 7.1

A:	$C_{pe,10}$=	-1.2	A=1.60m		w_e=	-0.487 kN/m²
B:	$C_{pe,10}$=	-0.8		spoljašnji pritisci vetra	w_e=	-0.325 kN/m²
C:	$C_{pe,10}$=	-0.5		$w_e = q_{p(z)} * C_{p,e} \rightarrow$	w_e=	-0.203 kN/m²
D:	$C_{pe,10}$=	0.8			w_e=	0.325 kN/m²
E:	$C_{pe,10}$=	-0.5			w_e=	-0.203 kN/m²

Koeficijenti unutrašnjeg pritiska:

$C_{p,i}$ =	0.2	unutrašnji pritisci vetra $w_i = q_{p(z)} * C_{p,i} \rightarrow$	w_i=	0.081 kN/m²
$C_{p,i}$ =	-0.3		w_i=	-0.122 kN/m²

Kombinovati odgovarajuće spoljašnje i unutrašnje pritiske !!!

4.1.2. Koeficijenti spoljašnjeg pritiska vetra na krov novog dela prema tabeli 7.4a

F:	$C_{pe,10}$=	-1.7	F=2.0x0.8		w_e=	-0.691 kN/m²
G:	$C_{pe,10}$=	-1.2		spoljašnji pritisci vetra	w_e=	-0.487 kN/m²
H:	$C_{pe,10}$=	-0.6		$w_e = q_{p(z)} * C_{p,e} \rightarrow$	w_e=	-0.244 kN/m²
I:	$C_{pe,10}$=	-0.6			w_e=	-0.244 kN/m²
J:	$C_{pe,10}$=	-0.6	J=0.8m		w_e=	-0.244 kN/m²
B:	$B_{p,net}$=	-1.5	b=2.5m	prema tabeli 7.7	w_e=	-0.609 kN/m²
C:	$C_{p,net}$=	-1.4		prema tabeli 7.7	w_e=	-0.569 kN/m²

Koeficijenti unutrašnjeg pritiska:

$C_{p,i}$ =	0.2	unutrašnji pritisci vetra $w_i = q_{p(z)} * C_{p,i} \rightarrow$	w_i=	0.081 kN/m²

Kombinovati odgovarajuće spoljašnje i unutrašnje pritiske !!!

4.2. Uticaj vetra - upravno na sleme, nadstrešnica na navetrenoj strani

Dimenzije objekta: širina b=25.20m; visina h=4.00m; h < b

4.2.1. Koeficijenti spoljašnjeg pritiska vetra na zidove prema tabeli 7.1

A:	$C_{pe,10}$=	-1.2	A=1.60m		w_e=	-0.487 kN/m²
B:	$C_{pe,10}$=	-0.8		spoljašnji pritisci vetra	w_e=	-0.325 kN/m²
C:	$C_{pe,10}$=	-0.5		$w_e = q_{p(z)} * C_{p,e} \rightarrow$	w_e=	-0.203 kN/m²
D:	$C_{pe,10}$=	0.8			w_e=	0.325 kN/m²
E:	$C_{pe,10}$=	-0.5			w_e=	-0.203 kN/m²

Koeficijenti unutrašnjeg pritiska:

$C_{p,i}$ =	0.2	unutrašnji pritisci vetra $w_i = q_{p(z)} * C_{p,i} \rightarrow$	w_i=	0.081 kN/m²
$C_{p,i}$ =	-0.3		w_i=	-0.122 kN/m²

Kombinovati odgovarajuće spoljašnje i unutrašnje pritiske !!!

4.2.2. Koeficijenti spoljašnjeg pritiska vetra na krov novog dela prema tabeli 7.4a

F:	$C_{pe,10}$=	-1.7	F=2.0x0.8		w_e=	-0.691 kN/m²
G:	$C_{pe,10}$=	-1.2		spoljašnji pritisci vetra	w_e=	-0.487 kN/m²
H:	$C_{pe,10}$=	-0.6		$w_e = q_{p(z)} * C_{p,e} \rightarrow$	w_e=	-0.244 kN/m²
I:	$C_{pe,10}$=	-0.6			w_e=	-0.244 kN/m²
J:	$C_{pe,10}$=	-0.6	J=0.8m		w_e=	-0.244 kN/m²
B:	$B_{p,net}$=	-2		prema tabeli 7.7	w_e=	-0.812 kN/m²
C:	$C_{p,net}$=	-1.8		prema tabeli 7.7	w_e=	-0.731 kN/m²

Koeficijenti unutrašnjeg pritiska:

$C_{p,i}$ =	0.2	unutrašnji pritisci vetra $w_i = q_{p(z)} * C_{p,i} \rightarrow$	w_i=	0.081 kN/m²

Kombinovati odgovarajuće spoljašnje i unutrašnje pritiske !!!

4.3. Uticaj vetra - upravno na kalkan

Dimenzije objekta: širina b=5.40m; visina h=4.00m; h < b

4.3.1. Koeficijenti spoljašnjeg pritiska vetra na zidove prema tabeli 7.1

A:	$C_{pe,10}$=	-1.2	A=1.0m	w_e=	-0.487	kN/m²
B:	$C_{pe,10}$=	-0.8	B=4.5m	w_e=	-0.325	kN/m²
C:	$C_{pe,10}$=	-0.5		w_e=	-0.203	kN/m²
D:	$C_{pe,10}$=	0.8		w_e=	0.325	kN/m²
E:	$C_{pe,10}$=	-0.5		w_e=	-0.203	kN/m²

spoljašnji pritisci vetra $w_e = q_{p(z)} * C_{p,e} \rightarrow$

Koeficijenti unutrašnjeg pritiska:

$C_{p,i}$ =	0.2	unutrašnji pritisci vetra $w_i = q_{p(z)} * C_{p,i} \rightarrow$	w_i=	0.081 kN/m²
$C_{p,i}$ =	-0.3		w_i=	-0.122 kN/m²

Kombinovati odgovarajuće spoljašnje i unutrašnje pritiske !!!

4.3.2. Koeficijenti spoljašnjeg pritiska vetra na krov novog dela prema tabeli 7.4a

F:	$C_{pe,10}$=	-1.7	F=0.5x1.5m	w_e=	-0.691	kN/m²
G:	$C_{pe,10}$=	-1.2		w_e=	-0.487	kN/m²
H:	$C_{pe,10}$=	-0.6	H=2.0m	w_e=	-0.244	kN/m²
I:	$C_{pe,10}$=	-0.6		w_e=	-0.244	kN/m²
B:	$B_{p,net}$=	-1.5	prema tabeli 7.7	w_e=	-0.609	kN/m²
C:	$C_{p,net}$=	-1.4	prema tabeli 7.7	w_e=	-0.569	kN/m²

spoljašnji pritisci vetra $w_e = q_{p(z)} * C_{p,e} \rightarrow$

Koeficijenti unutrašnjeg pritiska:

$C_{p,i}$ =	0.2	unutrašnji pritisci vetra $w_i = q_{p(z)} * C_{p,i} \rightarrow$	w_i=	0.081 kN/m²

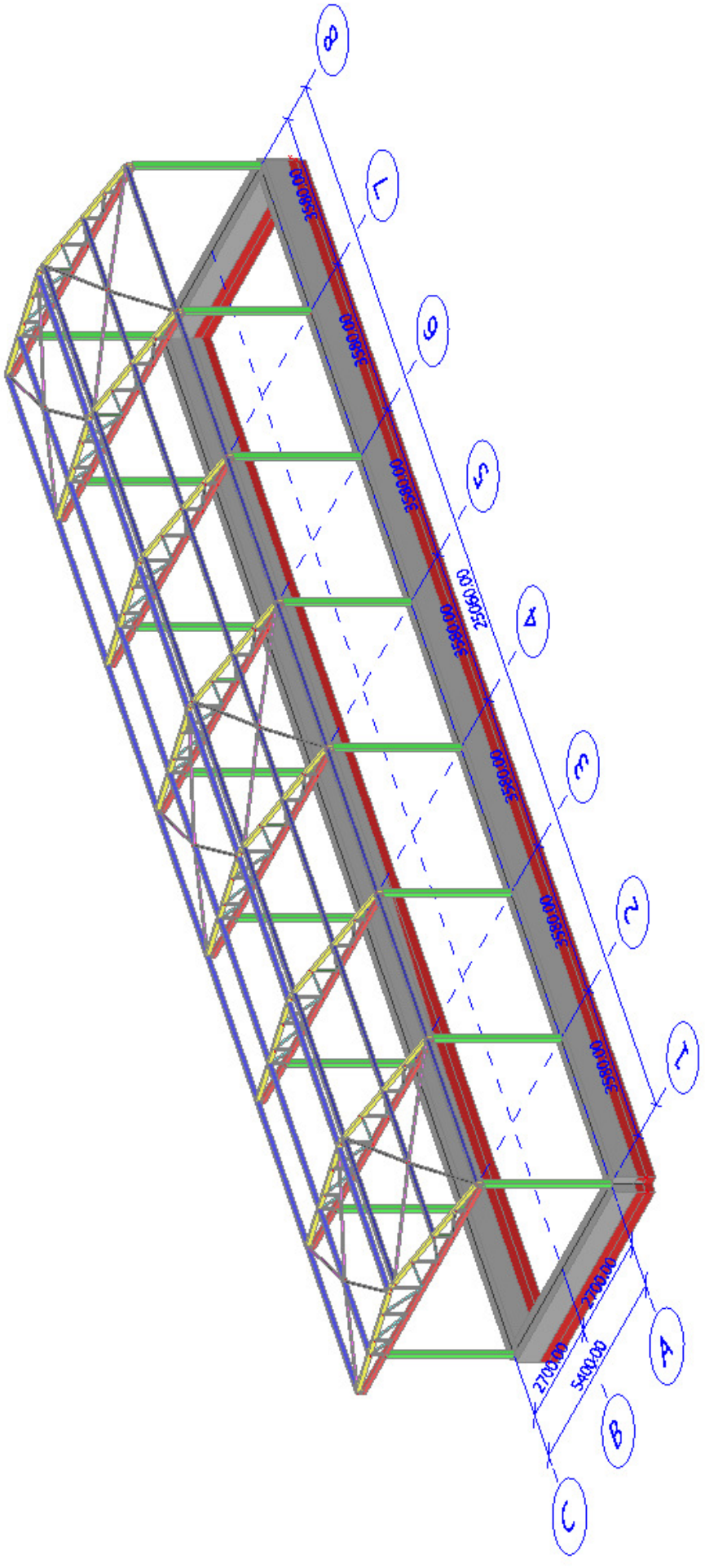
Kombinovati odgovarajuće spoljašnje i unutrašnje pritiske !!!

5. Seizmika - (prema SRPS EN 1998-1) i odgovarajući NA

Uzeto u obzir direktno kroz program sa sledećim ulaznim podacima:

- Lokacija:		B. Topola
- Referentno maksimalno ubrzanje tla tipa A:	a_{gR}=	0.05g
- Faktor značaja:	$\gamma_1 = \gamma_a$ =	1
- Projektno ubrzanje tla:	$a_g = \gamma_1 * a_{gR}$ = 1*0.05g =	0.05g
- Kategorija tla:		D
- Tip elastičnog odgovora:		1
- Faktor ponašanja:	q_a=	1.5
- Faktor tla (iz tabele 3.2):	S=	1.35

1. Izometrija



2. Ulazni podaci - konstrukcija

2.1. Materijali

Čelik EC3

Naziv	ρ [kg/m³]	E_{mod} [MPa]	μ	Lower limit [cm]	Upper limit [cm]	F_y [MPa]	F_u [MPa]	Boja
		G_{mod} [MPa]	α [m/m°C]					
S 235	7850.000	2.100e+05	0.3	0.00	4.00	235.000	360.000	
		8.077e+04	0.00	4.00	8.00	215.000	360.000	

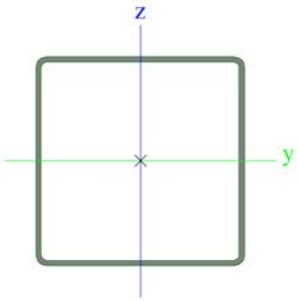
Naziv	Vrsta	ρ [kg/m³]	Gustoća u svježem stanju [kg/m³]	E_{mod} [MPa]	μ	α [m/m°C]	$f_{c.k.28}$ [MPa]	Boja
C25/30	Beton	2500.000	2600.000	3.150e+04	0.2	0.00	25.00	

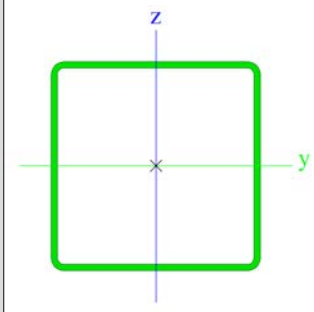
Objašnjenja simbola	
Gustoća u svježem stanju	Vrijednost svojstva gustoće u svježem stanju koristi se samo za spregnute ploeč i računa svoju vlastitu težinu kao opterećenje.

Armatura EC2

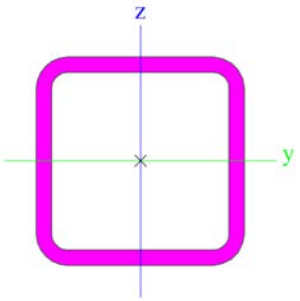
Naziv	Vrsta	ρ [kg/m³]	E_{mod} [MPa]	G_{mod} [MPa]	α [m/m°C]	$f_{y.k}$ [MPa]
B 500B	Armaturni čelik	7850.000	2.000e+05	8.333e+04	0.00	500.0

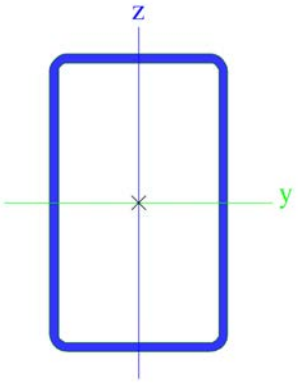
2.2. Poprečni-presjeci

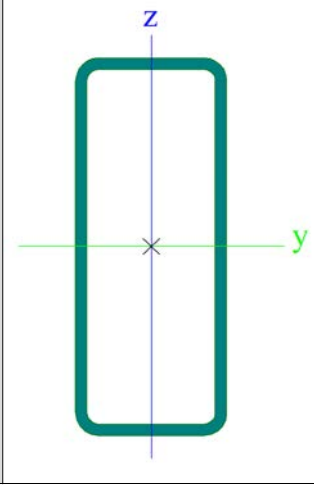
120x120x3		
Vrsta	CFRHS120X120X3	
Formcode	2 - Rectangular hollow section	
Vrsta oblika	Tankostjeni	
materijal predmeta	S 235	
Proizvodnja	hladno oblikovani	
Boja		
Čvrstoća izvijanje y-y, Čvrstoća izvijanje z-z	c	c
A [cm²]	13.810	
A_y [cm²], A_z [cm²]	6.902	6.902
A_L [m²/m], A_D [m²/m]	4.70e-01	9.20e-01
$c_{Y.UCS}$ [cm], $c_{Z.UCS}$ [cm]	6.00	6.00
α [deg]	0.00	
I_y [cm⁴], I_z [cm⁴]	312.350	312.350
i_y [cm], i_z [cm]	4.76	4.76
$W_{el.y}$ [cm³], $W_{el.z}$ [cm³]	52.060	52.060
$W_{pl.y}$ [cm³], $W_{pl.z}$ [cm³]	60.240	60.240
$M_{pl.y.+}$ [kNcm], $M_{pl.y.-}$ [kNcm]	1.41e+03	1.41e+03
$M_{pl.z.+}$ [kNcm], $M_{pl.z.-}$ [kNcm]	1.41e+03	1.41e+03
d_y [cm], d_z [cm]	0.00	0.00
I_t [cm⁴], I_w [cm⁶]	487.720	6220.800
β_y [cm], β_z [cm]	0.00	0.00
Slika		

100x100x3		
Vrsta	CFRHS100X100X3	
Formcode	2 - Pravokutni šuplji profil	
Vrsta oblika	Tankostjeni	
materijal predmeta	S 235	
Proizvodnja	hladno oblikovani	
Boja		
Čvrstoća izvijanje y-y, Čvrstoća izvijanje z-z	c	c
A [cm²]	11.410	
A_y [cm²], A_z [cm²]	5.702	5.702
A_L [m²/m], A_D [m²/m]	3.90e-01	7.60e-01
$c_{Y.UCS}$ [cm], $c_{Z.UCS}$ [cm]	5.00	5.00
α [deg]	0.00	
I_y [cm⁴], I_z [cm⁴]	177.050	177.050
i_y [cm], i_z [cm]	3.94	3.94
$W_{el.y}$ [cm³], $W_{el.z}$ [cm³]	35.410	35.410
$W_{pl.y}$ [cm³], $W_{pl.z}$ [cm³]	41.210	41.210
$M_{pl.y.+}$ [kNcm], $M_{pl.y.-}$ [kNcm]	9.68e+02	9.68e+02
$M_{pl.z.+}$ [kNcm], $M_{pl.z.-}$ [kNcm]	9.68e+02	9.68e+02
d_y [cm], d_z [cm]	0.00	0.00
I_t [cm⁴], I_w [cm⁶]	278.680	2500.000
β_y [cm], β_z [cm]	0.00	0.00
Slika		

40x40x3		
Vrsta	CFRHS40X40X3	
Formcode	2 - Pravokutni šuplji profil	
Vrsta oblika	Tankostjeni	
materijal predmeta	S 235	
Proizvodnja	hladno oblikovani	
Boja		
Čvrstoća izvijanje y-y, Čvrstoća izvijanje z-z	c	c
A [cm²]	4.210	
A_y [cm²], A_z [cm²]	2.102	2.102
A_L [m²/m], A_D [m²/m]	1.50e-01	2.80e-01
$c_{Y.UCS}$ [cm], $c_{Z.UCS}$ [cm]	2.00	2.00
α [deg]	0.00	
I_y [cm⁴], I_z [cm⁴]	9.320	9.320
i_y [cm], i_z [cm]	1.49	1.49
$W_{el.y}$ [cm³], $W_{el.z}$ [cm³]	4.660	4.660
$W_{pl.y}$ [cm³], $W_{pl.z}$ [cm³]	5.720	5.720
$M_{pl.y.+}$ [kNcm], $M_{pl.y.-}$ [kNcm]	1.34e+02	1.34e+02
$M_{pl.z.+}$ [kNcm], $M_{pl.z.-}$ [kNcm]	1.34e+02	1.34e+02
d_y [cm], d_z [cm]	0.00	0.00
I_t [cm⁴], I_w [cm⁶]	15.750	25.600

β_y [cm], β_z [cm]	0.00	0.00
Slika		

100x60x3		
Vrsta	CFRHS100X60X3	
Formcode	2 - Pravokutni šuplji profil	
Vrsta oblika	Tankostjeni	
materijal predmeta	S 235	
Proizvodnja	hladno oblikovani	
Boja		
Čvrstoća izvijanje y-y, Čvrstoća izvijanje z-z	c	c
A [cm^2]	9.010	
A_y [cm^2], A_z [cm^2]	3.376	5.627
A_L [m^2/m], A_D [m^2/m]	3.10e-01	6.00e-01
$c_{Y.UCS}$ [cm], $c_{Z.UCS}$ [cm]	3.00	5.00
α [deg]	0.00	
I_y [cm^4], I_z [cm^4]	120.570	54.650
i_y [cm], i_z [cm]	3.66	2.46
$W_{el.y}$ [cm^3], $W_{el.z}$ [cm^3]	24.110	18.220
$W_{pl.y}$ [cm^3], $W_{pl.z}$ [cm^3]	29.570	20.790
$M_{pl.y.+}$ [kNcm], $M_{pl.y.-}$ [kNcm]	6.94e+02	6.94e+02
$M_{pl.z.+}$ [kNcm], $M_{pl.z.-}$ [kNcm]	4.88e+02	4.88e+02
d_y [cm], d_z [cm]	0.00	0.00
I_t [cm^4], I_w [cm^6]	121.670	720.000
β_y [cm], β_z [cm]	0.00	0.00
Slika		

100x40x3		
Vrsta	CFRHS100X40X3	
Formcode	2 - Pravokutni šuplji profil	
Vrsta oblika	Tankostjeni	
materijal predmeta	S 235	
Proizvodnja	hladno oblikovani	
Boja		
Čvrstoća izvijanje y-y, Čvrstoća izvijanje z-z	c	c
A [cm^2]	7.810	
A_y [cm^2], A_z [cm^2]	2.230	5.574
A_L [m^2/m], A_D [m^2/m]	2.70e-01	5.20e-01
$c_{Y.UCS}$ [cm], $c_{Z.UCS}$ [cm]	2.00	5.00
α [deg]	0.00	
I_y [cm^4], I_z [cm^4]	92.340	21.670
i_y [cm], i_z [cm]	3.44	1.67
$W_{el.y}$ [cm^3], $W_{el.z}$ [cm^3]	18.470	10.840
$W_{pl.y}$ [cm^3], $W_{pl.z}$ [cm^3]	23.750	12.380
$M_{pl.y.+}$ [kNcm], $M_{pl.y.-}$ [kNcm]	5.58e+02	5.58e+02
$M_{pl.z.+}$ [kNcm], $M_{pl.z.-}$ [kNcm]	2.91e+02	2.91e+02
d_y [cm], d_z [cm]	0.00	0.00
I_t [cm^4], I_w [cm^6]	59.050	280.000
β_y [cm], β_z [cm]	0.00	0.00
Slika		

Objašnjenja simbola	
Formcode	h - Height b - Width s - Thickness r - Outer radijus R1 \ limar radijus
A	Površina
A_y	Površina posmika u glavnom y-smjeru
A_z	Površina posmika u glavnom z-smjeru
A_L	Opseg po jedinici duljine
A_D	Površina Sušenje po jedinici duljine
$c_{Y.UCS}$	Težište koordinirata u Y-smjeru unosa
$c_{Z.UCS}$	Težište koordinirata u Z-smjeru unosa
$I_{Y.LCS}$	Drugi moment površine oko YLKS osi
$I_{Z.LCS}$	Drugi moment površine oko ZLKS osi
$I_{YZ.LCS}$	Trenutak Proizvod prostora u LCS sustav
α	Kut zakretanja glavne osi sustava
I_y	Drugi moment površine oko glavne y-osi
I_z	Drugi moment površine oko glavne z-osi
i_y	Radijus giracije o glavnoj osi y

Objašnjenja simbola	
i_z	Radijus giracije o glavnoj osi z
$W_{el.y}$	Modula elastičnosti sekcije o glavnoj osi y
$W_{el.z}$	Modula elastičnosti sekcije o glavnoj osi z
$W_{pl.y}$	Plastika Moment otpora o glavnoj osi y
$W_{pl.z}$	Plastika Moment otpora o glavnoj osi z
$M_{pl.y.+}$	Plastični trenutak o glavnoj osi y za pozitivan moj trenutak
$M_{pl.y.-}$	Plastični trenutak o glavnoj osi y za negativnu moj trenutak
$M_{pl.z.+}$	Plastični trenutak o glavnom z-osi za pozitivan MZ trenutku
$M_{pl.z.-}$	Plastični trenutak o glavnom z-osi za negativnu MZ trenutku
d_y	Koordinata središta posmika u glavnom y-smjeru mjereno iz težišta
d_z	Koordinata središta posmika u glavnom z-smjeru mjereno iz težišta
I_t	Konstanta torzije

Objašnjenja simbola	
I_w	Konstanta vitoperenja
β_y	Mono-simetrija stalna o glavnoj osi y
β_z	Mono-simetrija stalna o glavnoj osi z

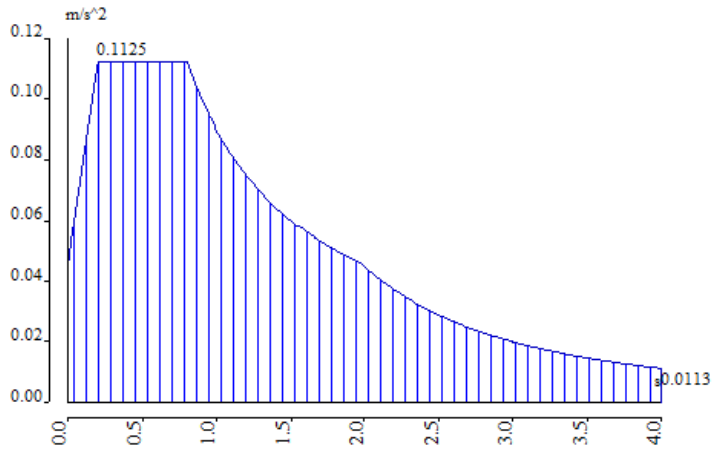
2.3. Slojevi

Naziv	Samo model konstrukcije	Boja
01 - Glavni stubovi	✗	
02 - Donji pojas	✗	
03 - Gornji pojas	✗	
04 - Vertikale	✗	
05 - Dijagonale	✗	
06 - Rožnjače	✗	
07 - Krovni spreg	✗	
08 - Temeljne grede	✗	
09 - Stope temelja	✗	
Pomoćne linije	✗	
Load panel za stalno	✗	
Load panel za vetar desno	✗	
Load panel za vetar levo	✗	
Load panel za vetar na kalkan	✗	

2.4. Tlo

Naziv	C1x [kN/m³]	C1z	C1y [kN/m³]	Krutost [kN/m³]	C2x [kN/m]	C2y [kN/m]
Glinovita prašina	2000.0000	Savitljiv	2000.0000	20000.0000	0.0000	0.0000

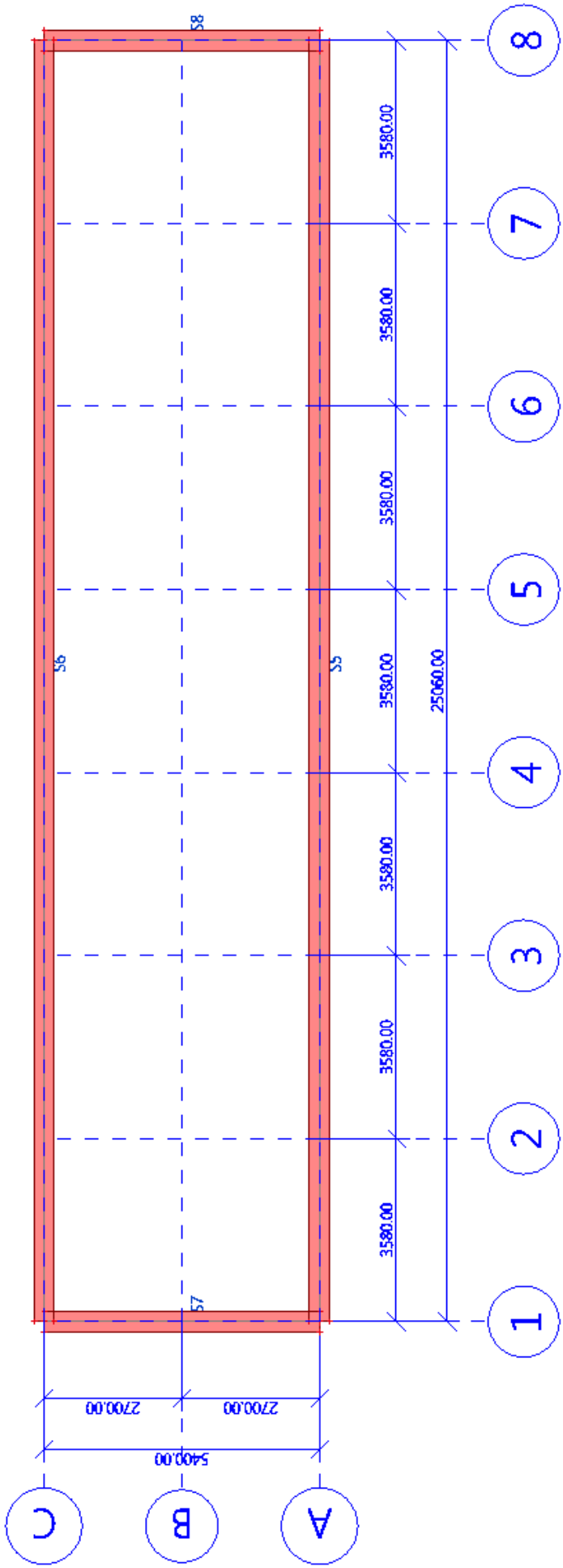
2.5. Seizmički spektri

Naziv	Vrsta crteža	Informacije	Crtež
JedinstveniID			
FS1	Razdoblje	Vrsta norme - Eurokod Podtlo vrsta - D Smjer - Horizontalno Vrsta spektra - vrsta 1 Koef ubrzanja. ag - 0.00509684 ag - proračunsko ubrzanje tla - 0.05 beta - 0.2 q - faktor ponašanja - 1.5	

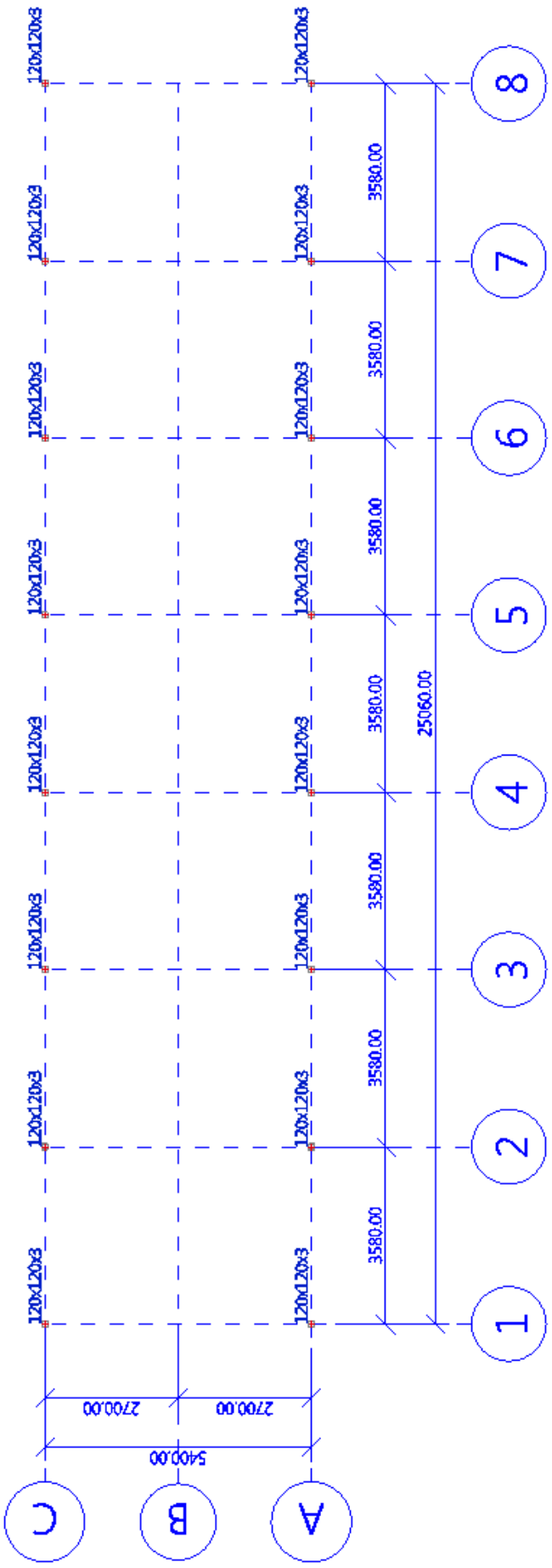
2.6. oslonci 2D elemenata

Naziv	Vrsta	temeljno tlo	2D element
SS1	Pojedinačno	Glinovita prašina - Tlo	S6
SS2	Pojedinačno	Glinovita prašina - Tlo	S7
SS3	Pojedinačno	Glinovita prašina - Tlo	S5
SS4	Pojedinačno	Glinovita prašina - Tlo	S8

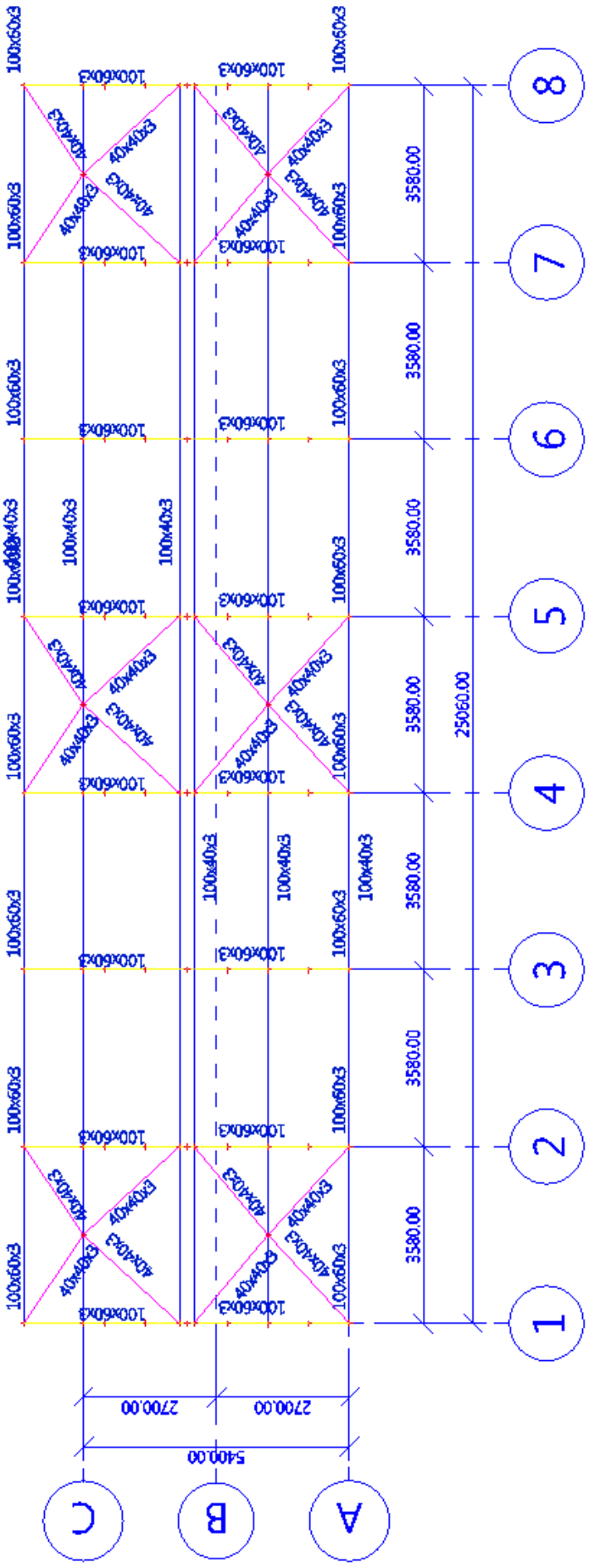
2.7. Temelji


S8
S6
S5
S7
3580.00
3580.00
3580.00
3580.00
3580.00
3580.00
25060.00
8
7
6
5
4
3
2
1
2700.00
2700.00
5400.00
C
B
A

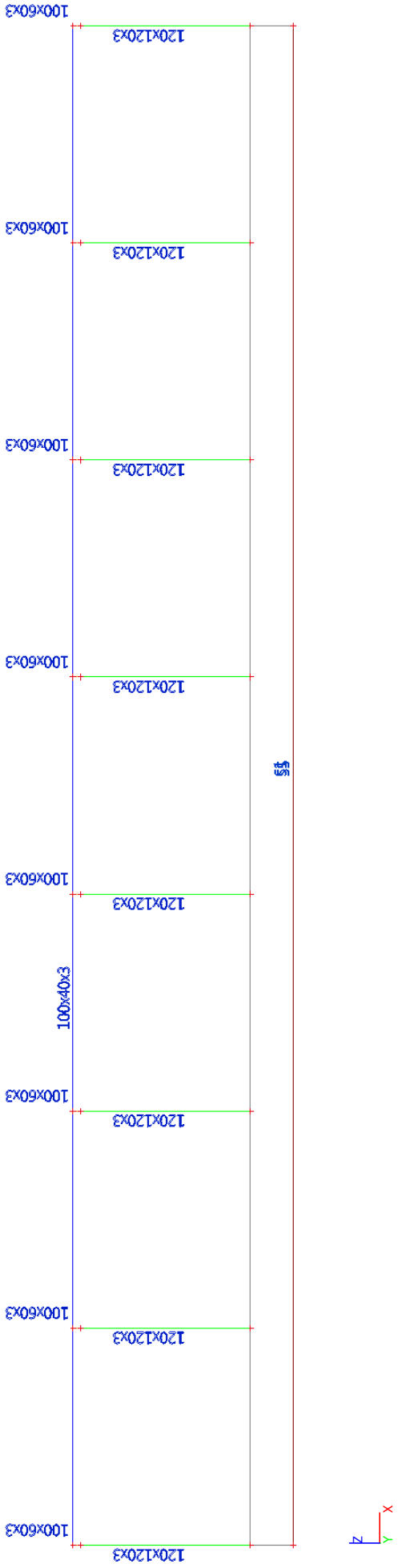
2.8. Osnova stubova



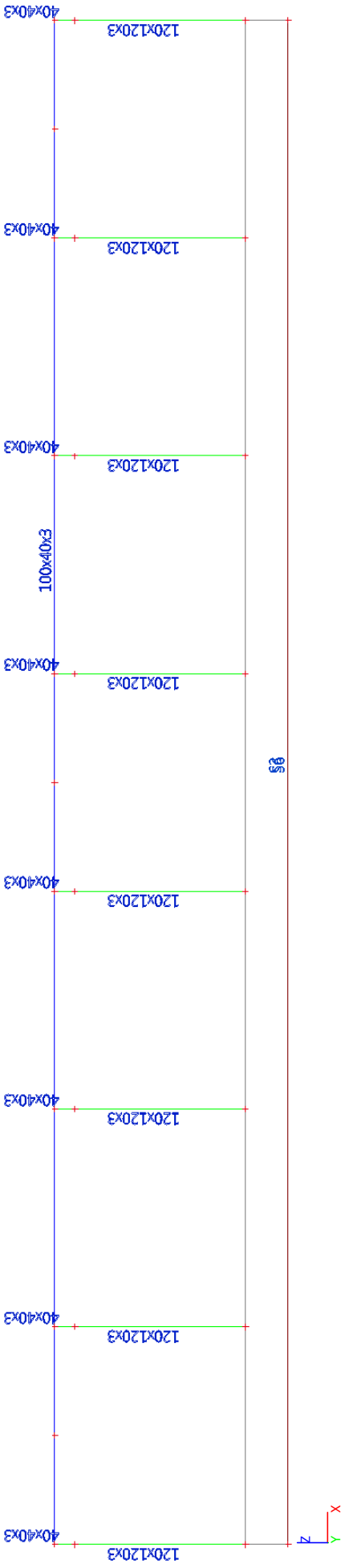
2.9. Osnova krova



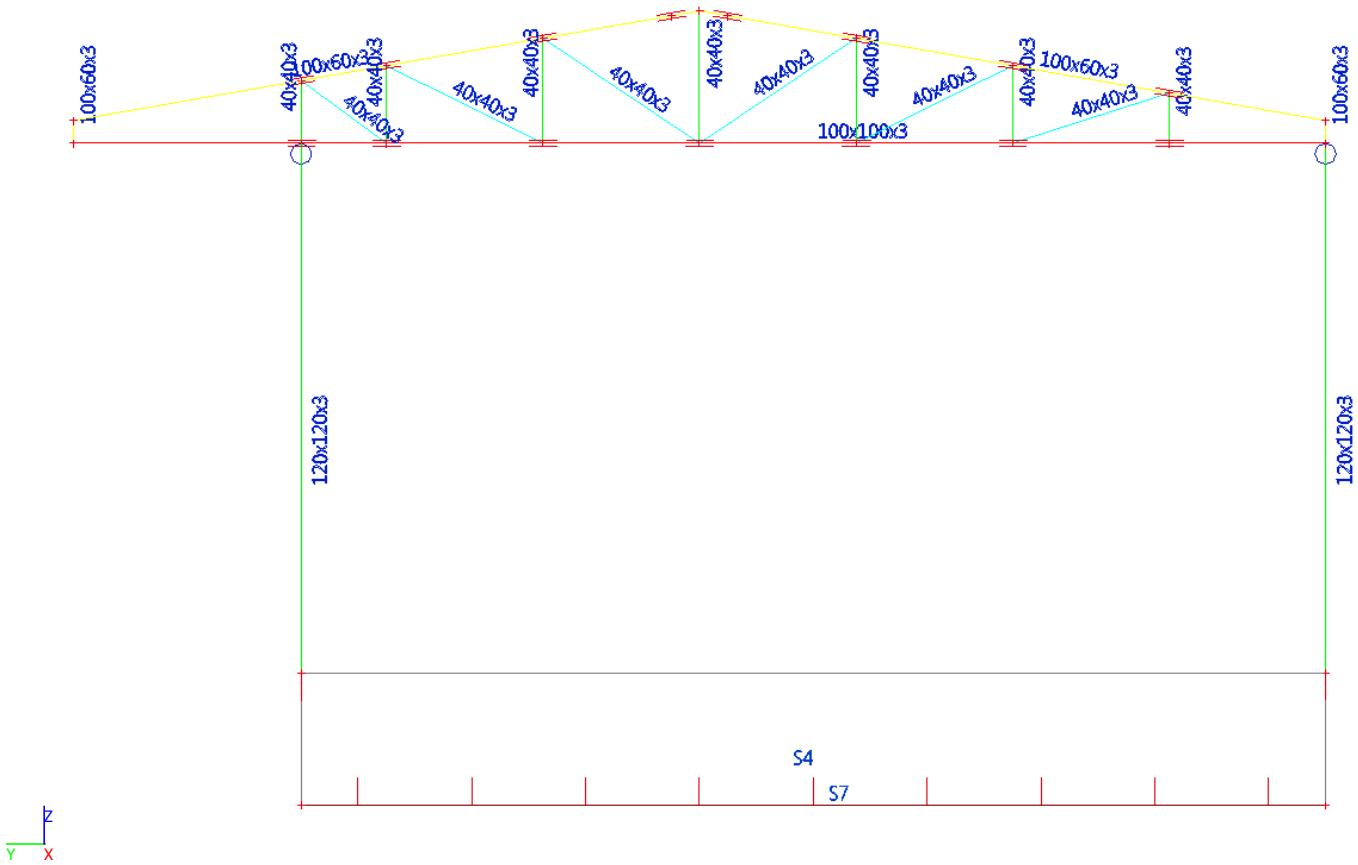
2.10. Konstrukcija u osi_A



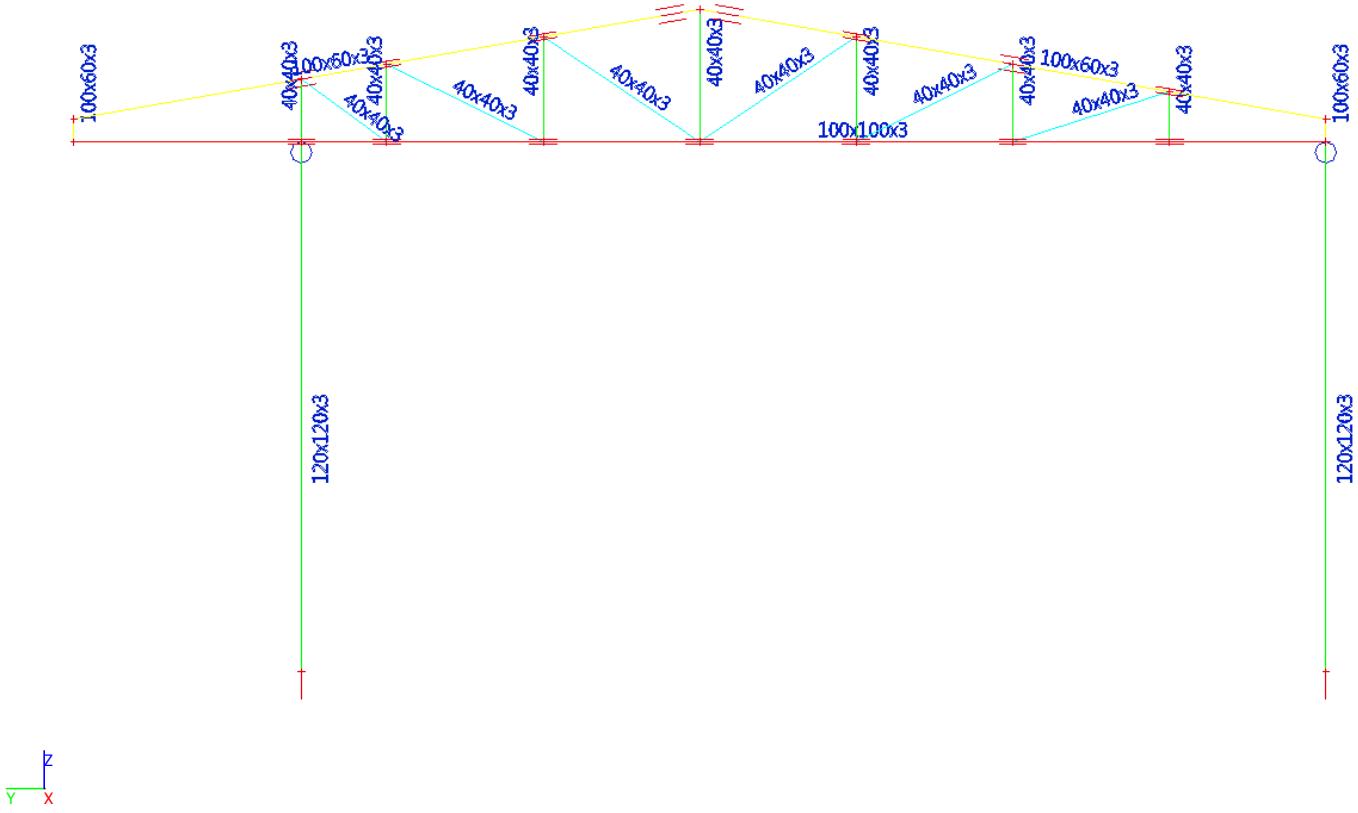
2.11. Konstrukcija podužnog zida do nadstrešnice



2.12. Konstrukcija u osama 1 i 8



2.13. Konstrukcija u osama 2 - 7



3. Ulazni podaci - opterećenje

3.1. Slučajevi opterećenja

Naziv	Opis	Vrsta aktivnosti	Grupa opterećenja	Smjer	Trajanje	Glavni slučaj opterećenja
	Spec	Vrsta opterećenja				
g	Sopstvena težina	Trajno Vlastita težina	LG1	-Z		
g1	Stalno opterećenje	Trajno Standardno	LG1			
p	Korisno opterećenje Standardno	Varijabla Stat.	LG2		Kratko	Ne postoji
s	Sneg simetrično Standardno	Varijabla Stat.	LG3		Kratko	Ne postoji
sL	Sneg antimetrično levo Standardno	Varijabla Stat.	LG3		Kratko	Ne postoji
sD	Sneg antimetrično desno Standardno	Varijabla Stat.	LG3		Kratko	Ne postoji
wD	Vetar sa desne strane Standardno	Varijabla Stat.	LG4		Kratko	Ne postoji
wL	Vetar sa leve strane Standardno	Varijabla Stat.	LG4		Kratko	Ne postoji
wK	Vetar na kalkan Standardno	Varijabla Stat.	LG4		Kratko	Ne postoji
Sx	Seizmika u X pravcu Seizmičnost	Varijabla Dinamičko	LG5			Ne postoji
Sy	Seizmika u Y pravcu Seizmičnost	Varijabla Dinamičko	LG5			Ne postoji
Sx_AE	Accidental eccentricity for Sx Seizmički izvanredni ekscentricitet	Varijabla Stat.	Sx_AE		Kratko	Sx - Seizmika u X pravcu
Sy_AE	Accidental eccentricity for Sy Seizmički izvanredni ekscentricitet	Varijabla Stat.	Sy_AE		Kratko	Sy - Seizmika u Y pravcu

3.2. Kombinacije

Naziv	Opis	Vrsta	Slučajevi opterećenja	Koef. [-]
ULS-Set B (auto)		HR-ULS (STR / GEO) Skupina B	g - Sopstvena težina	1.00
			g1 - Stalno opterećenje	1.00
			p - Korisno opterećenje	1.00
			s - Sneg simetrično	1.00
			sL - Sneg antimetrično levo	1.00
			sD - Sneg antimetrično desno	1.00
			wD - Vetar sa desne strane	1.00
			wL - Vetar sa leve strane	1.00
			wK - Vetar na kalkan	1.00
SLS-Char (auto)		HR-SLS Karakterističan	g - Sopstvena težina	1.00
			g1 - Stalno opterećenje	1.00
			p - Korisno opterećenje	1.00
			s - Sneg simetrično	1.00
			sL - Sneg antimetrično levo	1.00
			sD - Sneg antimetrično desno	1.00
			wD - Vetar sa desne strane	1.00
			wL - Vetar sa leve strane	1.00
			wK - Vetar na kalkan	1.00
SLS-Quasi (auto)		HR-SLS Kvazi-trajna	g - Sopstvena težina	1.00
			g1 - Stalno opterećenje	1.00
			p - Korisno opterećenje	1.00
			s - Sneg simetrično	1.00
			sL - Sneg antimetrično levo	1.00
			sD - Sneg antimetrično desno	1.00
			wD - Vetar sa desne strane	1.00
			wL - Vetar sa leve strane	1.00
			wK - Vetar na kalkan	1.00
ULS-Seis (auto)		HR-Seizmička	g - Sopstvena težina	1.00
			g1 - Stalno opterećenje	1.00
			p - Korisno opterećenje	1.00

Naziv	Opis	Vrsta	Slučajevi opterećenja	Koef. [-]
			s - Sneg simetrično	1.00
			sL - Sneg antimetrično levo	1.00
			sD - Sneg antimetrično desno	1.00
			wD - Vetar sa desne strane	1.00
			wL - Vetar sa leve strane	1.00
			wK - Vetar na kalkan	1.00
			Sx - Seizmika u X pravcu	1.00
			Sy - Seizmika u Y pravcu	1.00
			Sx_AE - Accidental eccentricity for Sx	1.00
			Sy_AE - Accidental eccentricity for Sy	1.00
Sx	Seismic load case "Sx" with accidental eccentricity effects	Omotnica - krajnji	Sx - Seizmika u X pravcu	1.00
			Sx_AE - Accidental eccentricity for Sx	1.00
Sy	Seismic load case "Sy" with accidental eccentricity effects	Omotnica - krajnji	Sy - Seizmika u Y pravcu	1.00
			Sy_AE - Accidental eccentricity for Sy	1.00
ULS-Set C		HR-ULS (STR / GEO) Skupina C	g - Sopstvena težina	1.00
			g1 - Stalno opterećenje	1.00
			p - Korisno opterećenje	1.00
			s - Sneg simetrično	1.00
			sL - Sneg antimetrično levo	1.00
			sD - Sneg antimetrično desno	1.00
			wD - Vetar sa desne strane	1.00
			wL - Vetar sa leve strane	1.00
			wK - Vetar na kalkan	1.00

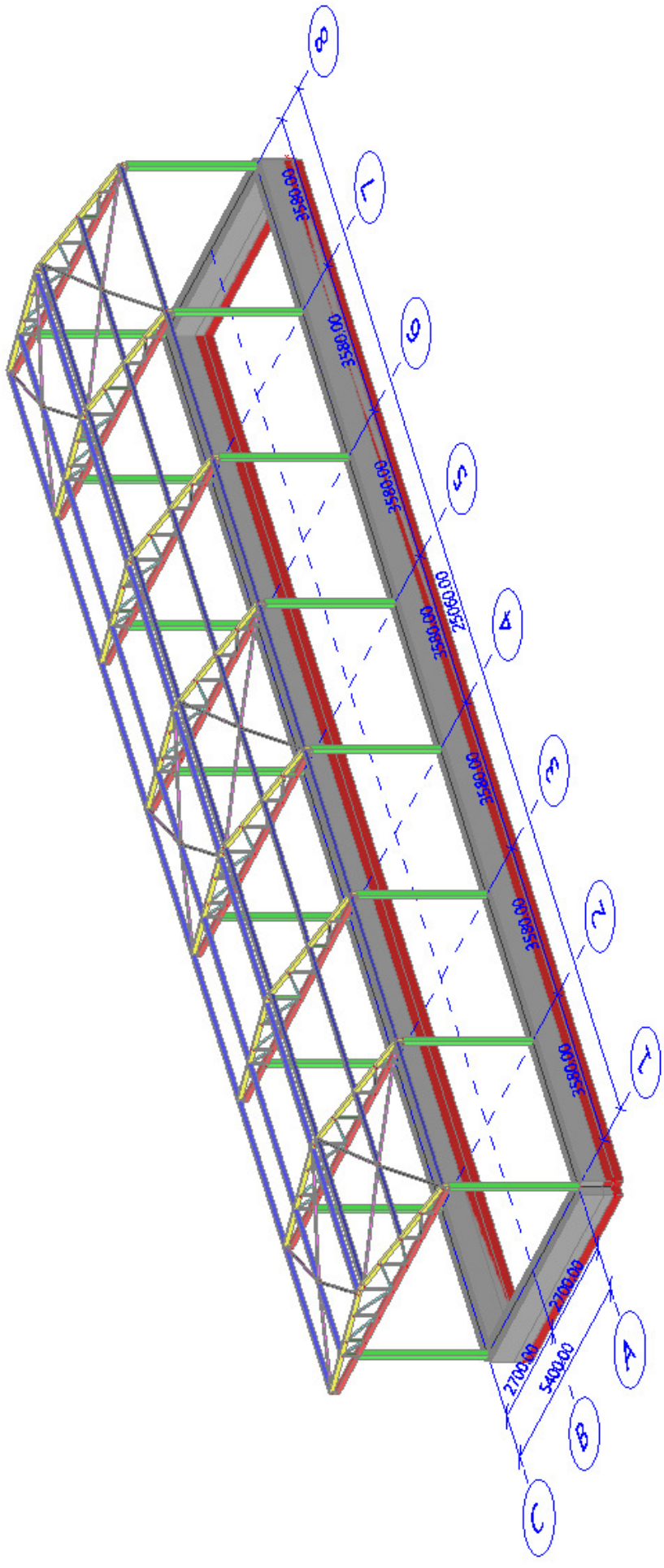
3.3. Grupe mase

Naziv	Slučaj opterećenja	Opis
MG1	g - Sopstvena težina	Sopstvena težina
MG2	g1 - Stalno opterećenje	Stalno opterećenje
MG3	p - Korisno opterećenje	Korisno opterećenje

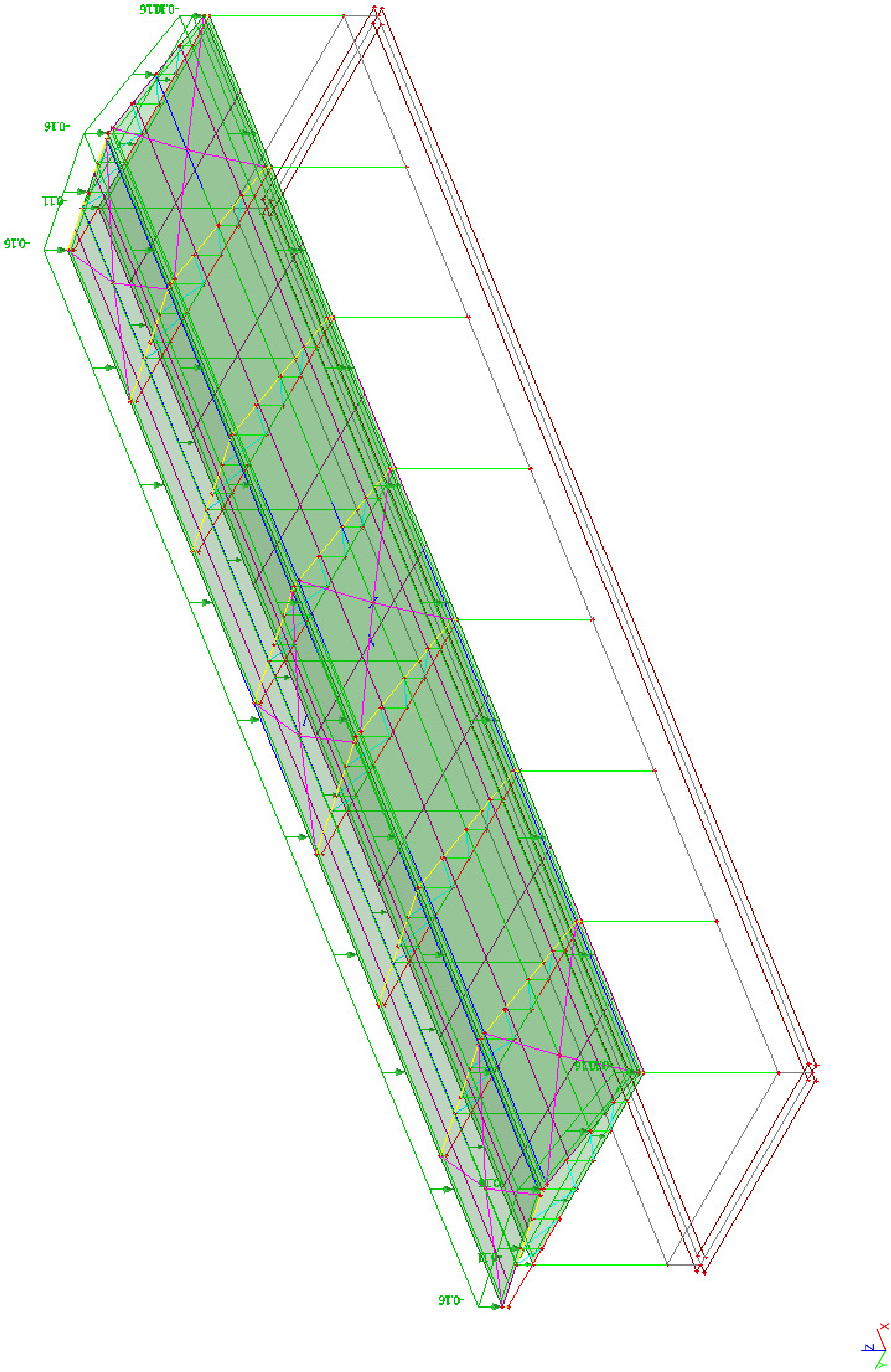
3.4. Klasa rezultata

Naziv	Popis
All ULS	ULS-Set B (auto) - HR-ULS (STR / GEO) Skupina B
	ULS-Seis (auto) - HR-Seizmička
	Sx - Omotnica - krajnji
	Sy - Omotnica - krajnji
	ULS-Set C - HR-ULS (STR / GEO) Skupina C
All SLS	SLS-Char (auto) - HR-SLS Karakterističan
	SLS-Quasi (auto) - HR-SLS Kvazi-trajna
All ULS+SLS	ULS-Set B (auto) - HR-ULS (STR / GEO) Skupina B
	ULS-Seis (auto) - HR-Seizmička
	Sx - Omotnica - krajnji
	Sy - Omotnica - krajnji
	ULS-Set C - HR-ULS (STR / GEO) Skupina C
	SLS-Char (auto) - HR-SLS Karakterističan
	SLS-Quasi (auto) - HR-SLS Kvazi-trajna
GEO	ULS-Set B (auto) - HR-ULS (STR / GEO) Skupina B
	ULS-Set C - HR-ULS (STR / GEO) Skupina C

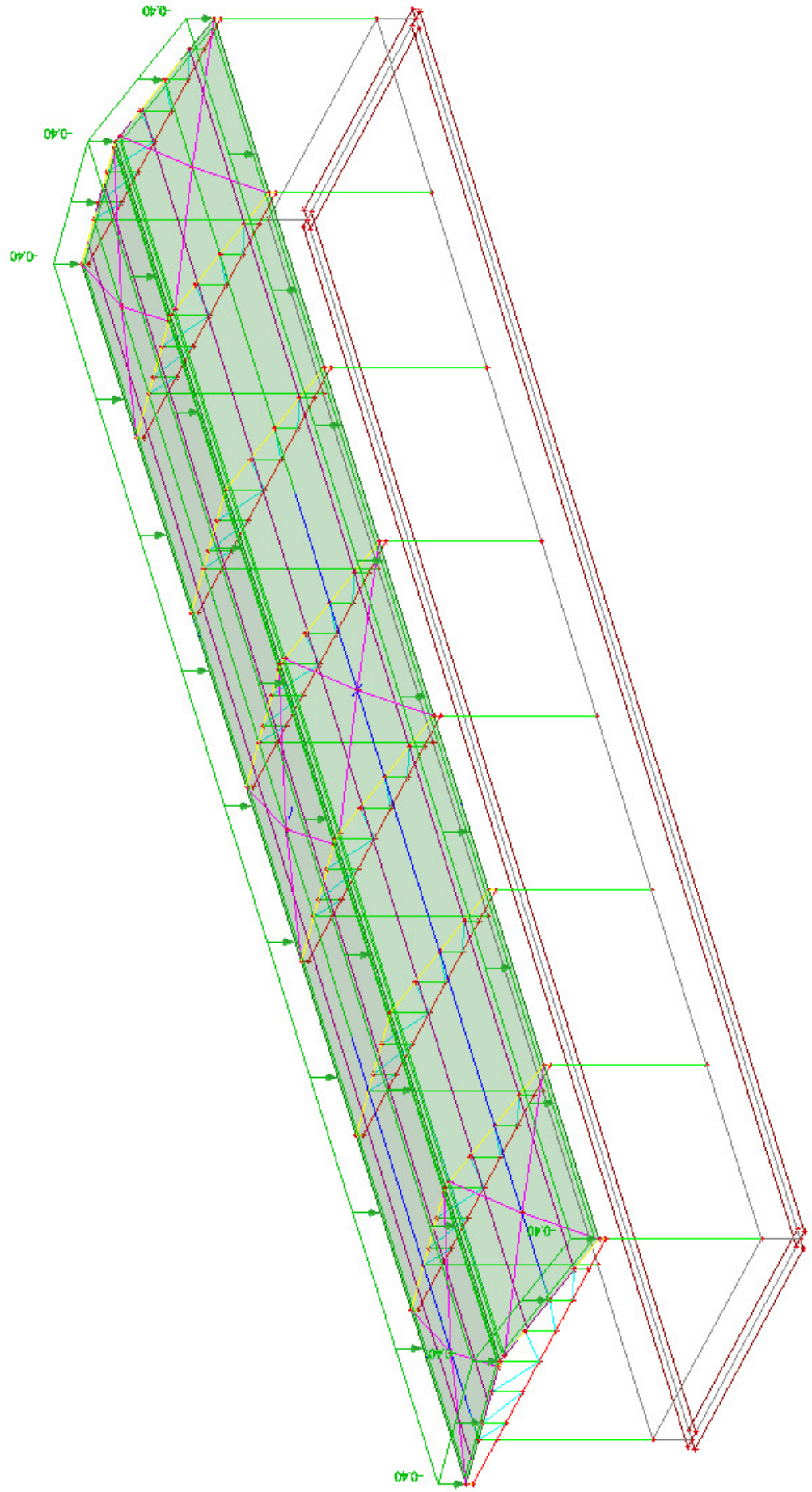
3.5. Sopstvena težina konstrukcije



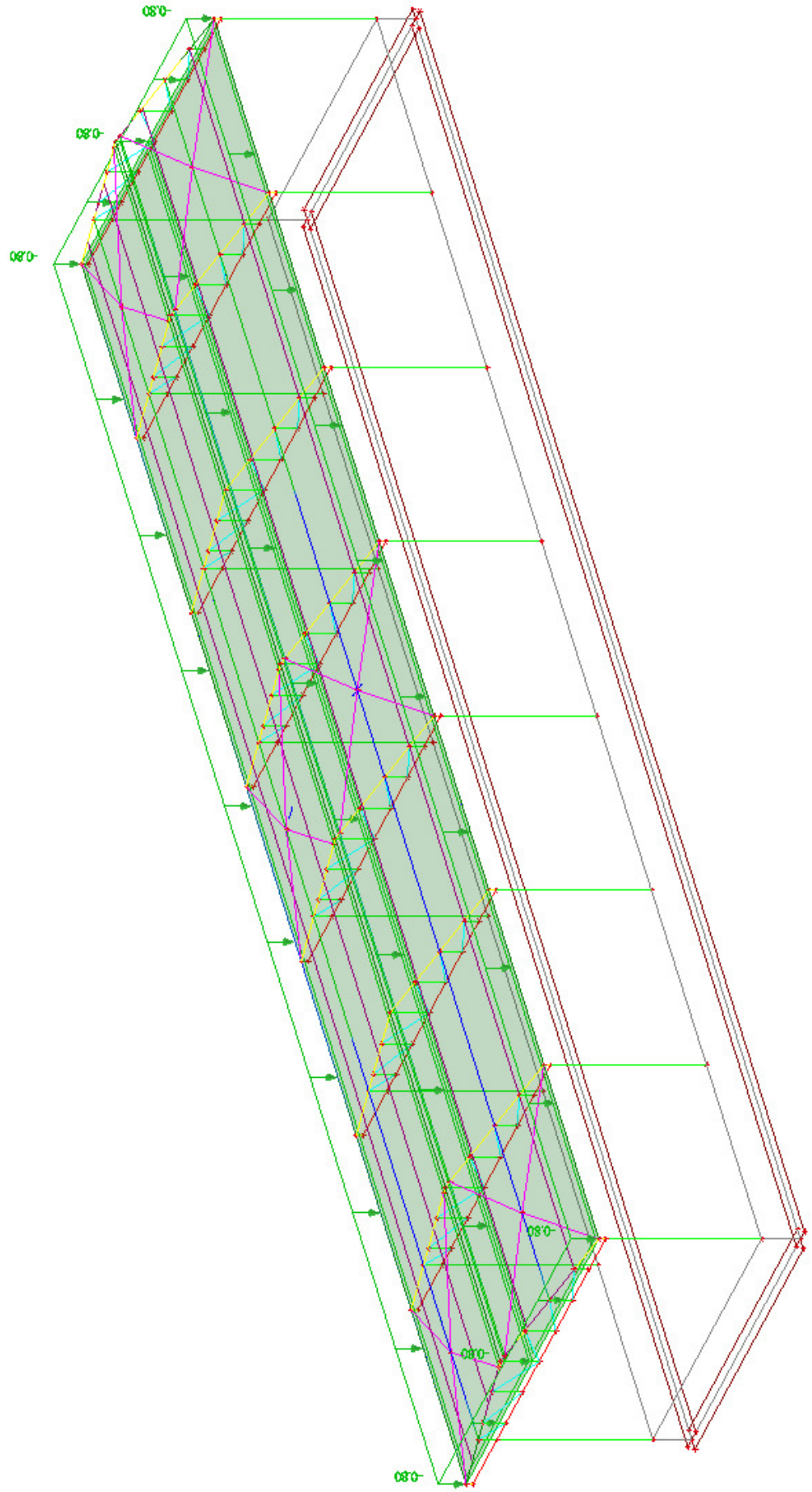
3.6. Dodatno stalno opterećenje



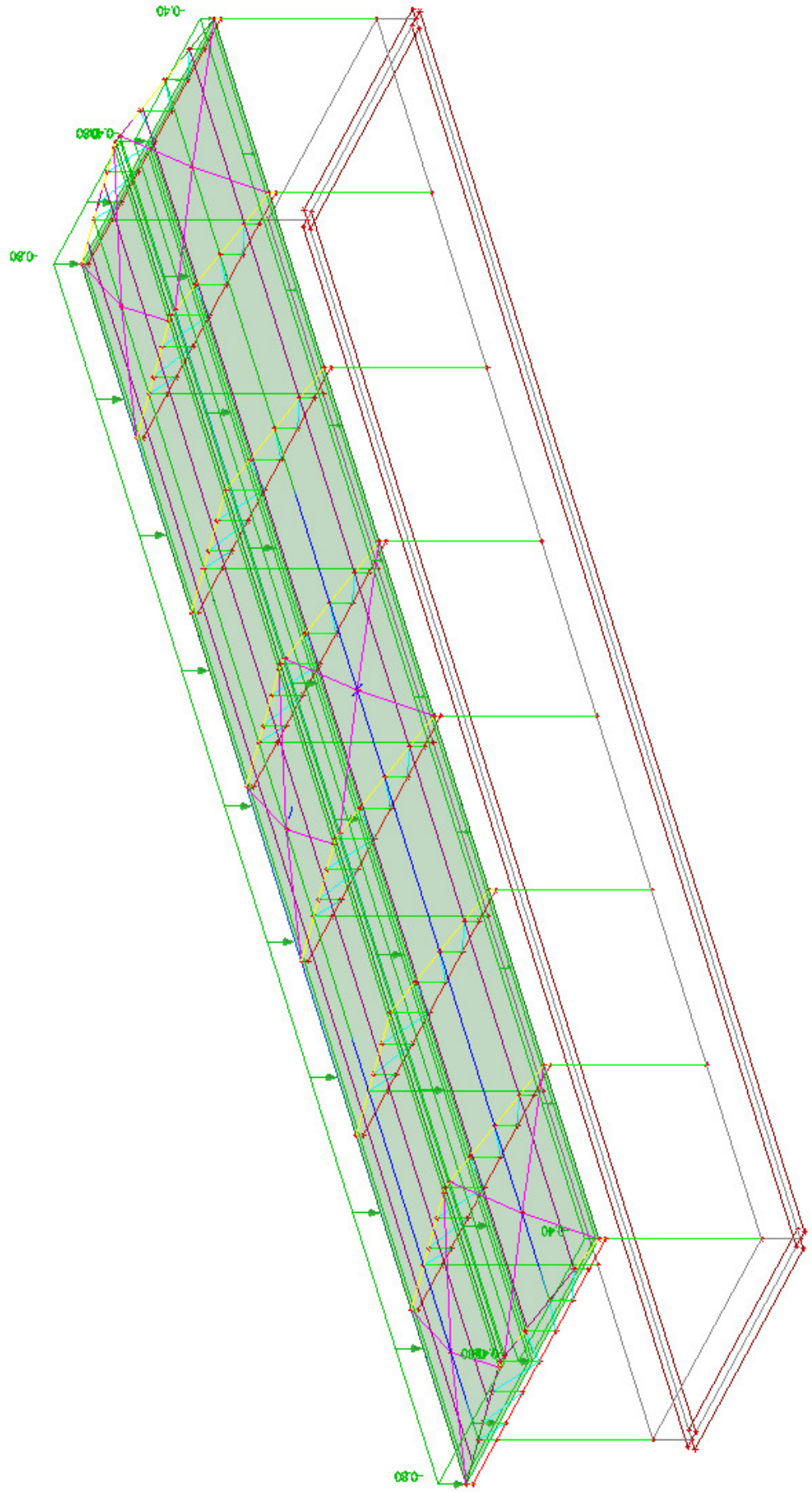
3.7. Korisno opterećenje



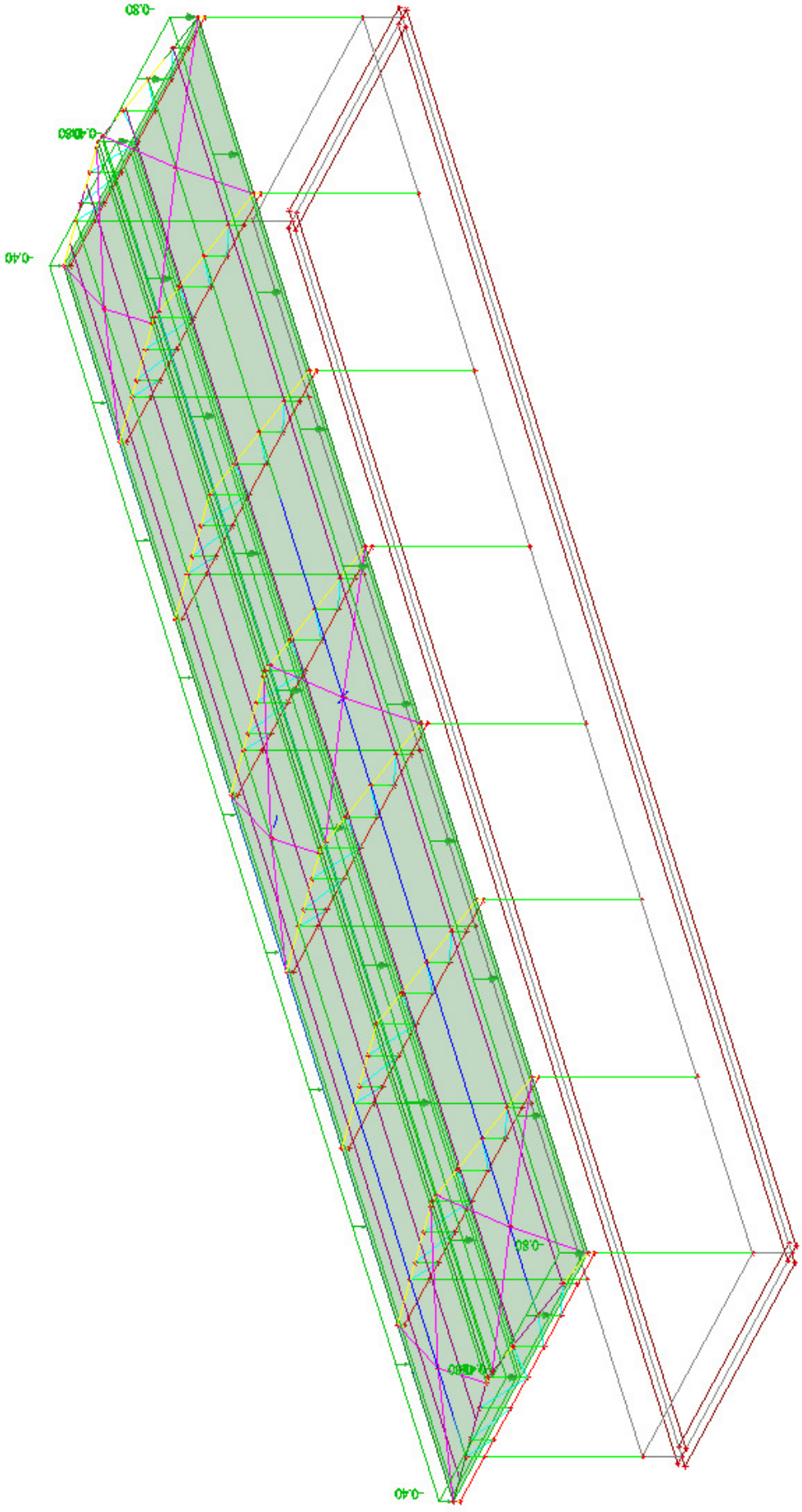
3.8. Sneg simetrično



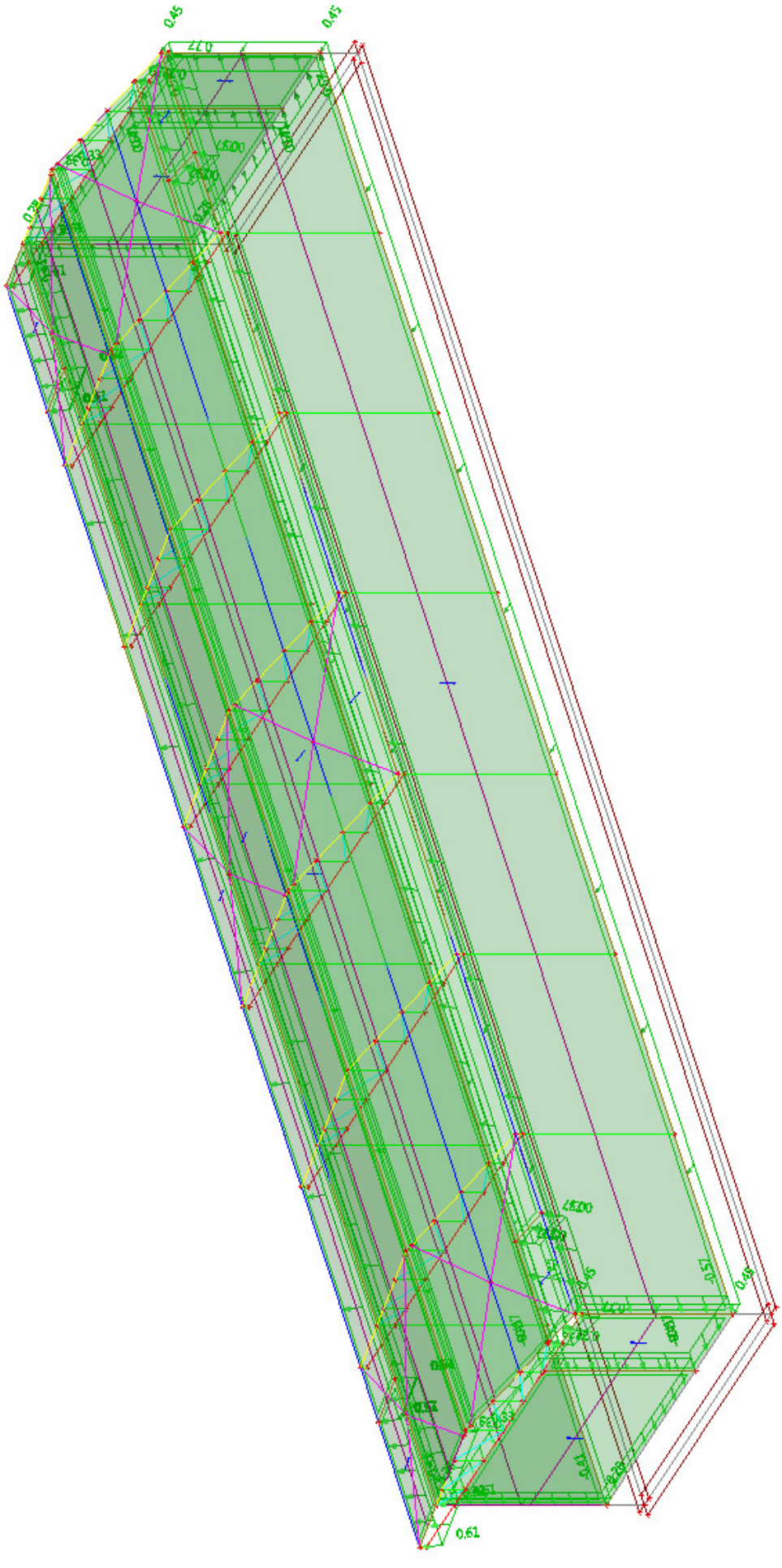
3.9. Sneg antimetrično levo



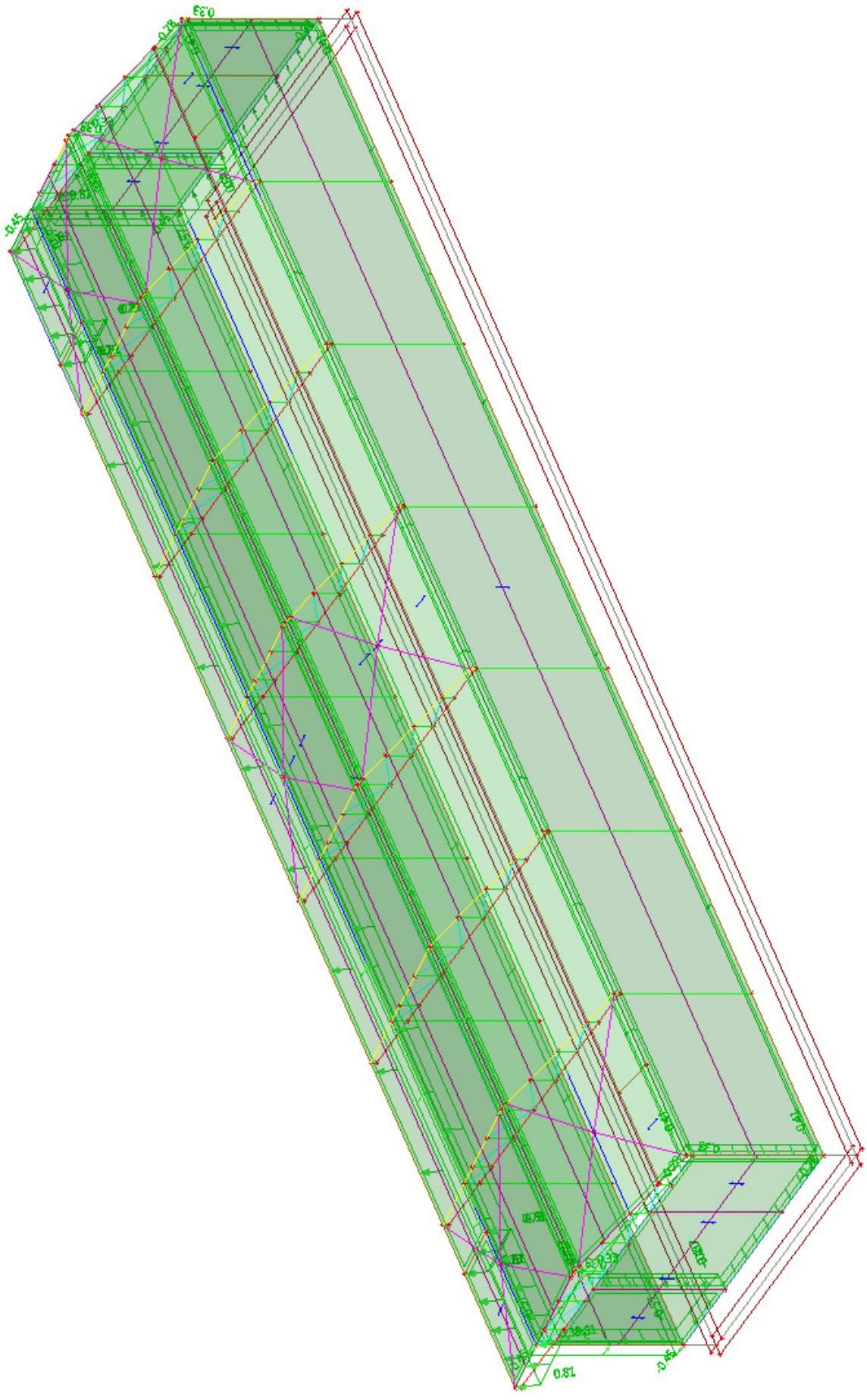
3.10. Sneg antimetrično desno



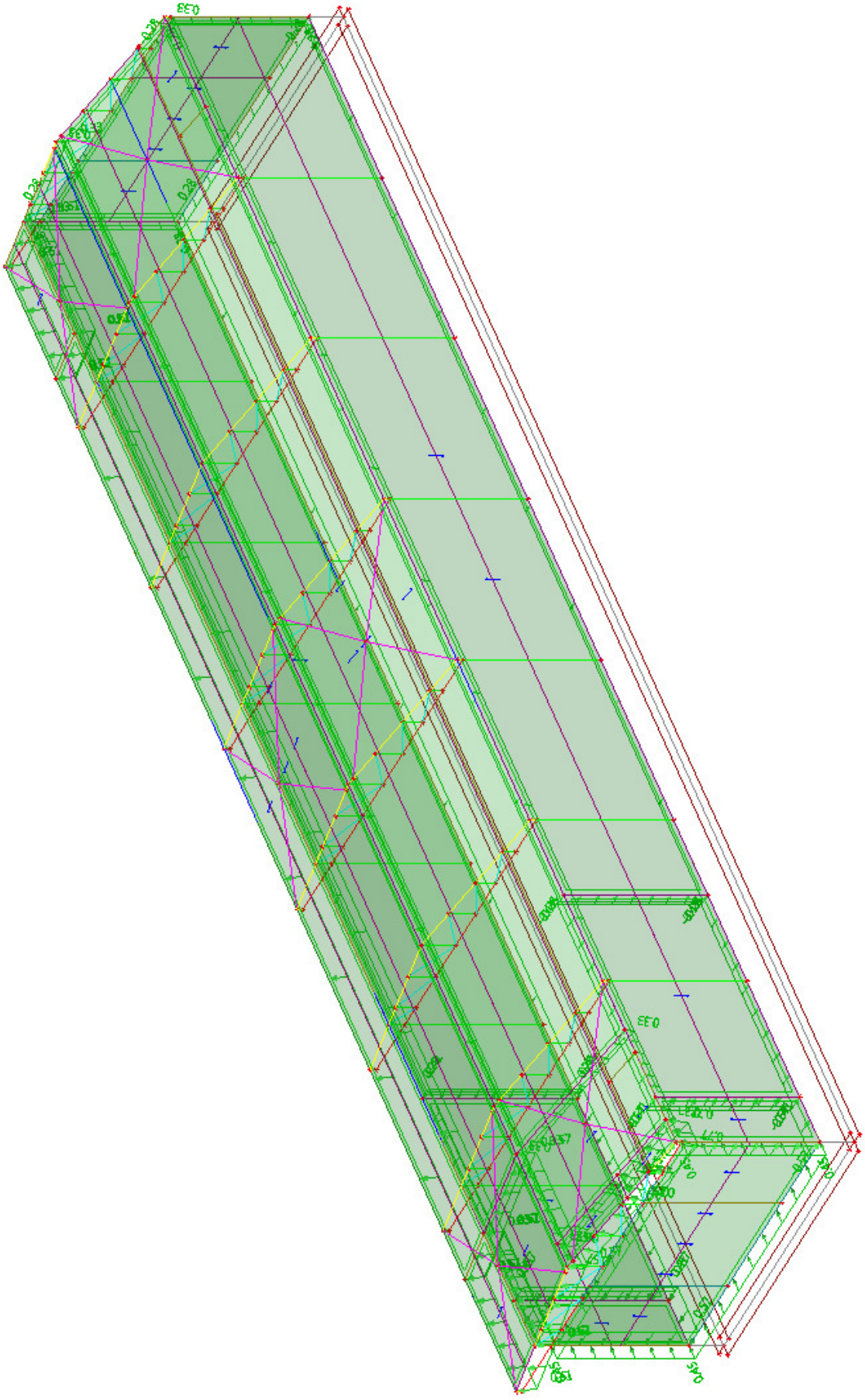
3.11. Vetar sa desne strane



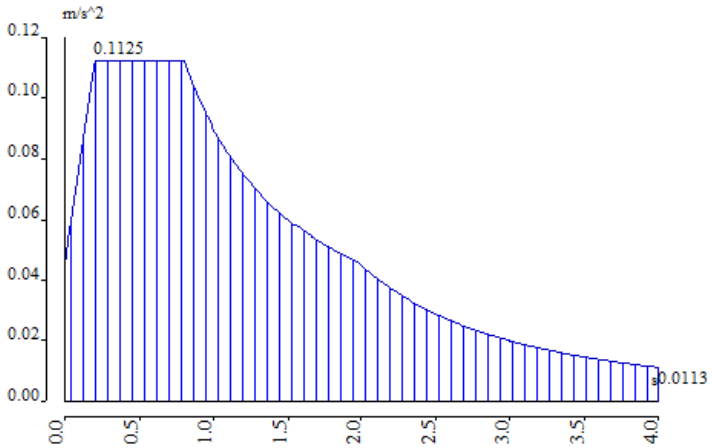
3.12. Vetar s leve strane



3.13. Vetar na kalkan



3.14. Seizmički spektri

Naziv JedinstveniID	Vrsta crteža	Informacije	Crtež
FS1	Razdoblje	Vrsta norme - Eurokod Podtlo vrsta - D Smjer - Horizontalno Vrsta spektra - vrsta 1 Koef ubrzanja. ag - 0.00509684 ag - proračunsko ubrzanje tla - 0.05 beta - 0.2 q - faktor ponašanja - 1.5	

3.15. Grupe mase

Naziv	Slučaj opterećenja	Opis
MG1	g - Sopstvena težina	Sopstvena težina
MG2	g1 - Stalno opterećenje	Stalno opterećenje
MG3	p - Korisno opterećenje	Korisno opterećenje

3.16. Kombinacija grupa masa

Naziv	Grupa mase	Koef. [-]
CM1	MG1 - Sopstvena težina	1.00
	MG2 - Stalno opterećenje	1.00
	MG3 - Korisno opterećenje	0.30

3.17. Etaža

Naziv	Z-Dolje [m]	Visina [m]
FL1	0.00	2.80
FL2	2.80	0.70
FL3	3.50	0.00

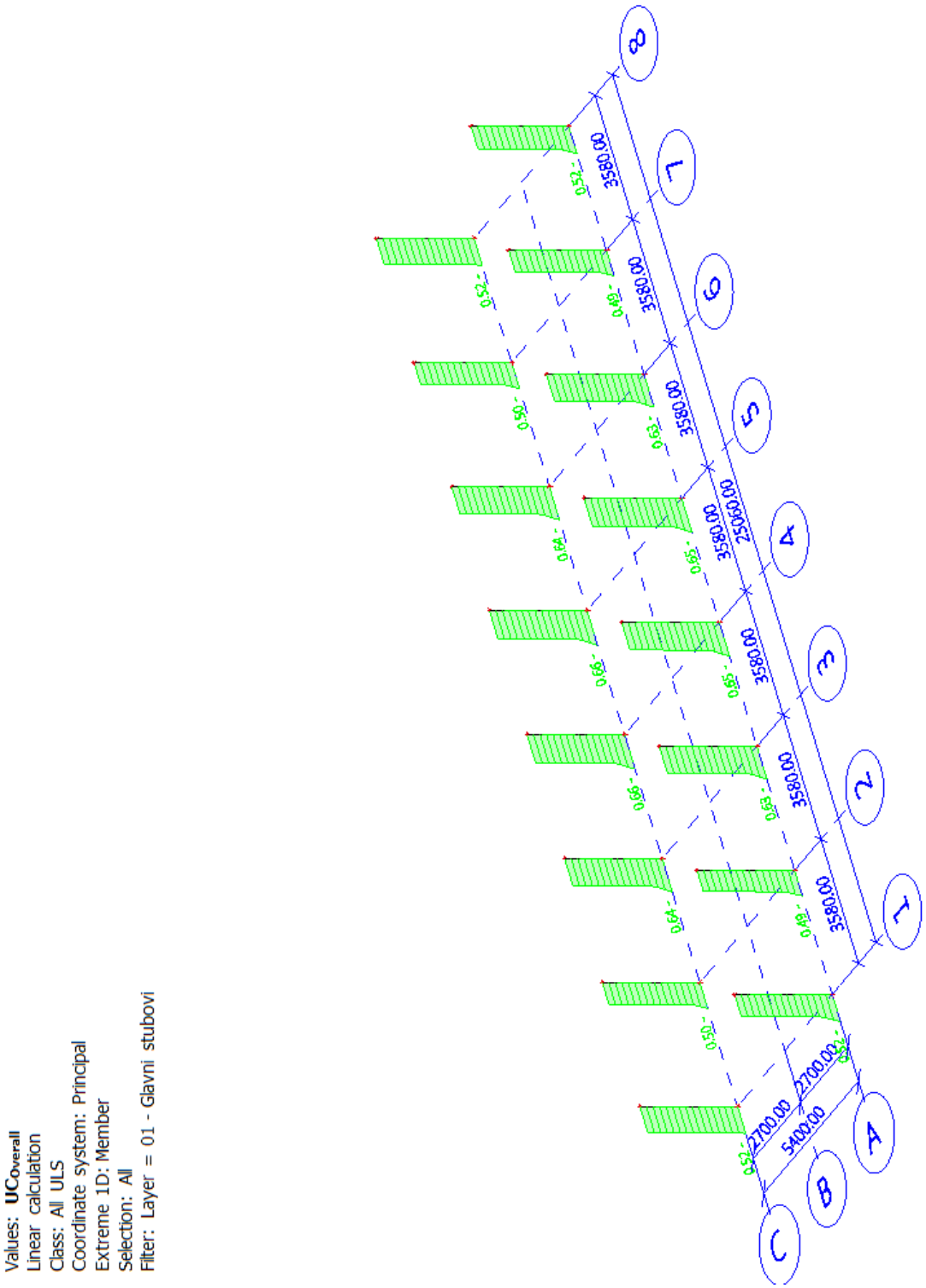
Objašnjenja simbola	
Z-Dolje	Z-Dolje
Visina	Visina

3.18. Vlastite frekvencije

N	f [Hz]	ω [1/s]	ω^2 [1/s^2]	T [s]
Kombinacija mase : CM1				
1	3.49	21.95	481.90	0.29
2	3.71	23.32	543.62	0.27
3	3.87	24.30	590.53	0.26
4	4.49	28.22	796.62	0.22
5	4.49	28.23	796.89	0.22
6	4.63	29.09	846.33	0.22

4. Nosivost i stabilnost konstruktivnih elemenata

4.1. EC-EN 1993 Steel check ULS; Ukupna provera_stubovi



4.2. EC-EN 1993 Provera stubova

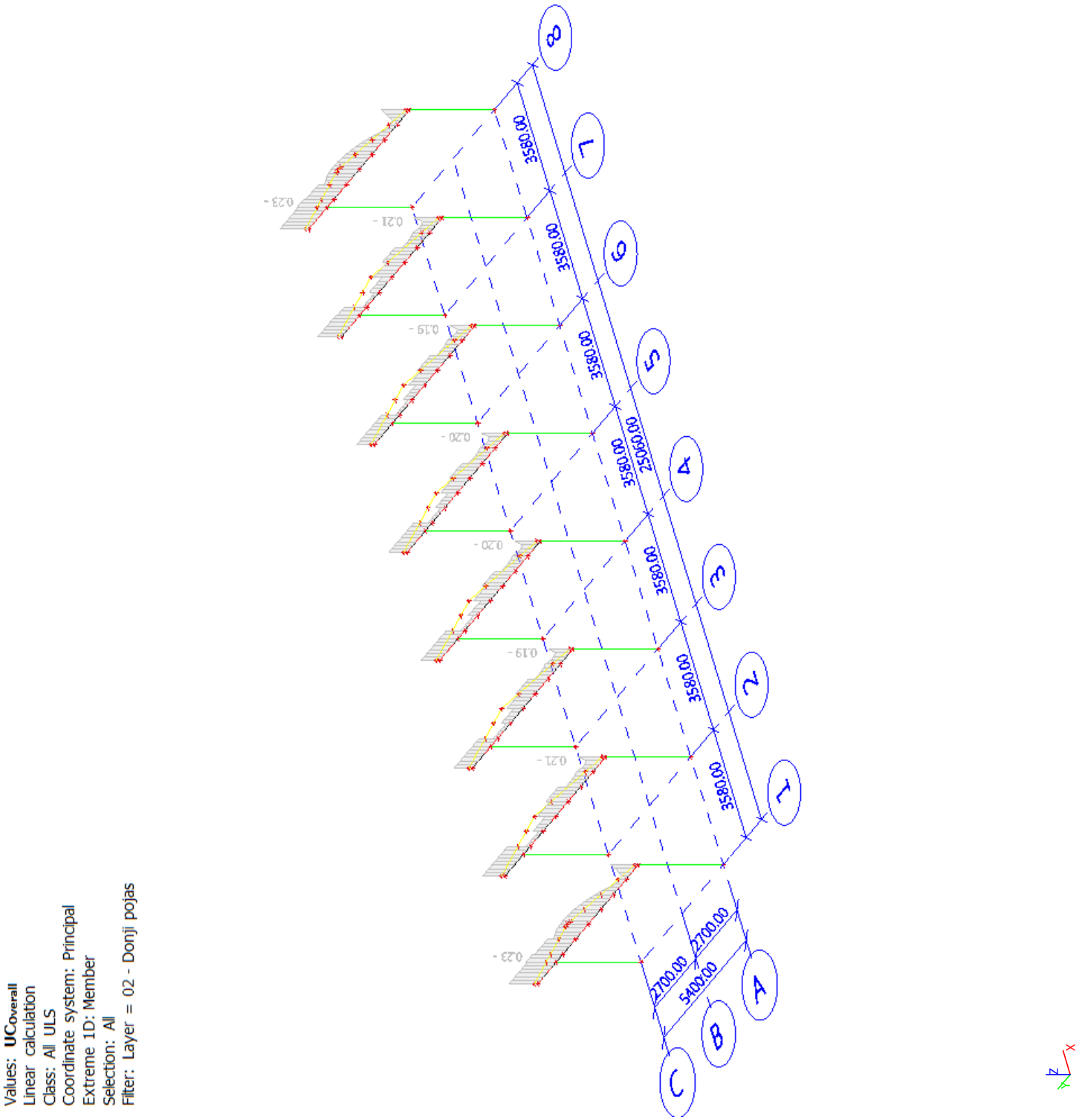
Linearni proračun
Klasa: All ULS
Koordinatni sistem: Glavni
Ekstremni 1D: Globalni
Odabir: Svi
Filtar: Sloj = 01 - Glavni stubovi

Ukupna Unity Provjera

Naziv	dx [m]	Slučaj	Poprečni presjek	Materijal	UC_{Ukupno} [-]	UC_{Sec} [-]	UC_{Stab} [-]
B8	0.00	ULS-Set B (auto)/1	120x120x3 - CFRHS120X120X3	S 235	**0.66**	0.66	0.54

Naziv	Kombinacijski ključ
ULS-Set B (auto)/1	1.35*g + 1.35*g1 + 0.75*sD + 1.50*wD

4.3. EC-EN 1993 Steel check ULS; Ukupna provera_donji pojas



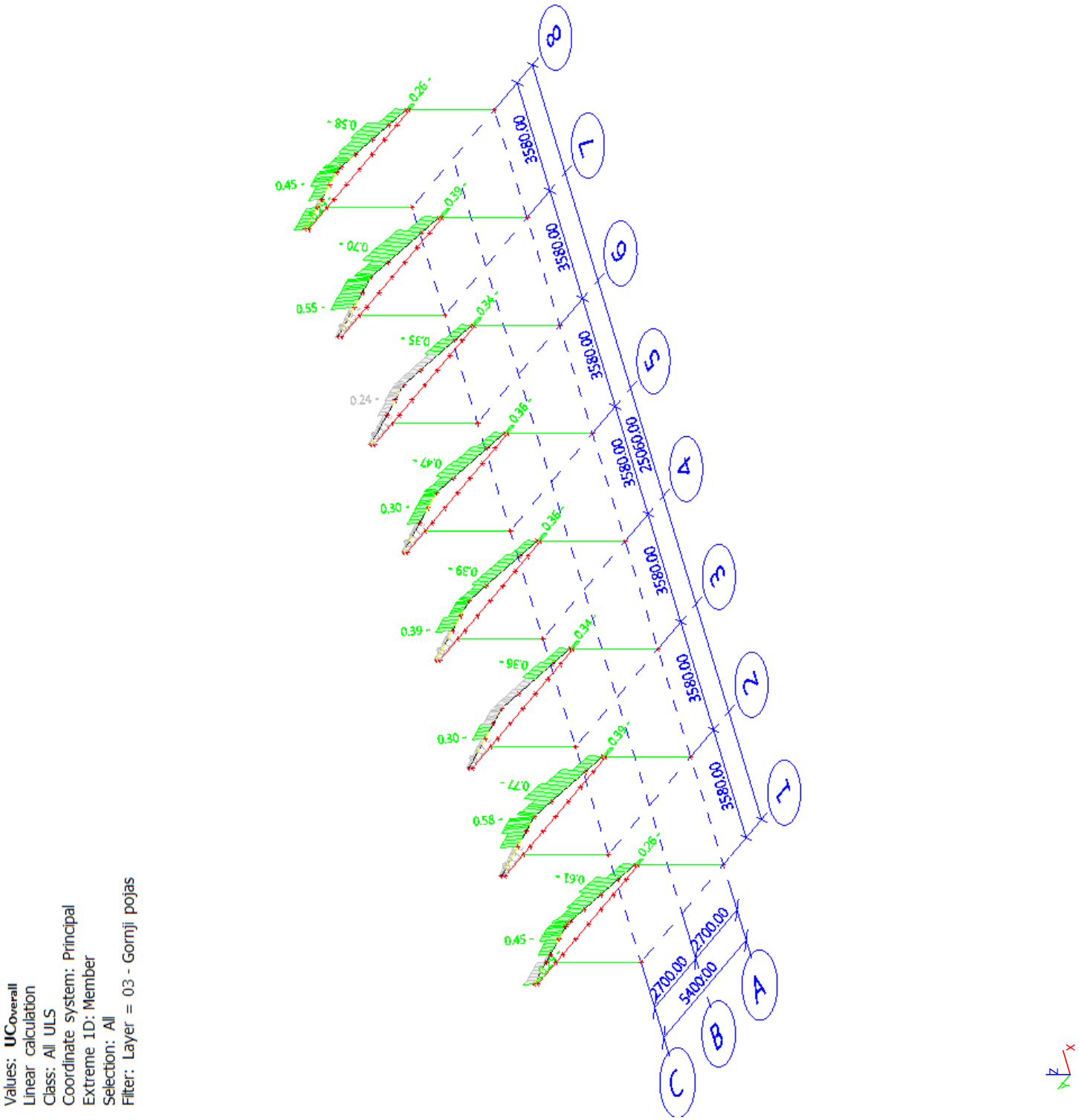
4.4. EC-EN 1993 Provera donjeg pojasa

Linearni proračun
Klasa: All ULS
Koordinatni sistem: Glavni
Ekstremni 1D: Globalni
Odabir: Svi
Filtar: Sloj = 02 - Donji pojas
Ukupna Unity Provjera

Naziv	dx [m]	Slučaj	Poprečni presjek	Materijal	UC_{Ukupno} [-]	UC_{Sec} [-]	UC_{Stab} [-]
B18	5.40-	ULS-Set B (auto)/1	100x100x3 - CFRHS100X100X3	S 235	**0.23**	0.07	0.23

Naziv	Kombinacijski ključ
ULS-Set B (auto)/1	1.35*g + 1.35*g1 + 0.75*s + 1.50*wD

4.5. EC-EN 1993 Steel check ULS; Ukupna provera_gornji pojas



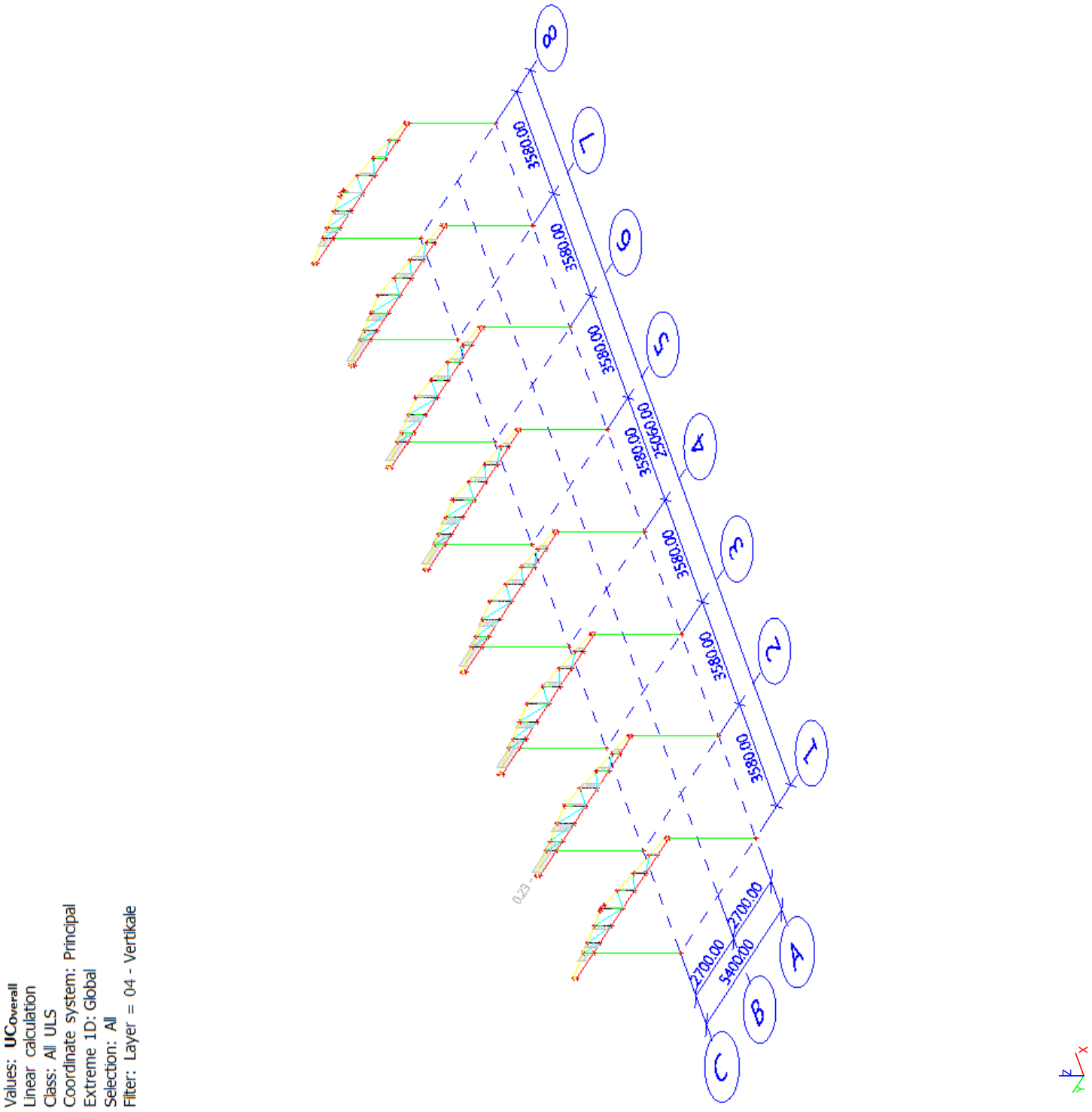
4.6. EC-EN 1993 Provera gornjeg pojasa

Linearni proračun
Klasa: All ULS
Koordinatni sistem: Glavni
Ekstremni 1D: Globalni
Odabir: Svi
Filtar: Sloj = 03 - Gornji pojas
Ukupna Unity Provjera

Naziv	dx [m]	Slučaj	Poprečni presjek	Materijal	UC_{Ukupno} [-]	UC_{Sec} [-]	UC_{Stab} [-]
B32	1.68+	ULS-Set B (auto)/1	100x60x3 - CFRHS100X60X3	S 235	**0.77**	0.17	0.77

Naziv	Kombinacijski ključ
ULS-Set B (auto)/1	1.35*g + 1.35*g1 + 1.50*s

4.7. EC-EN 1993 Steel check ULS; Ukupna provera_vertikale



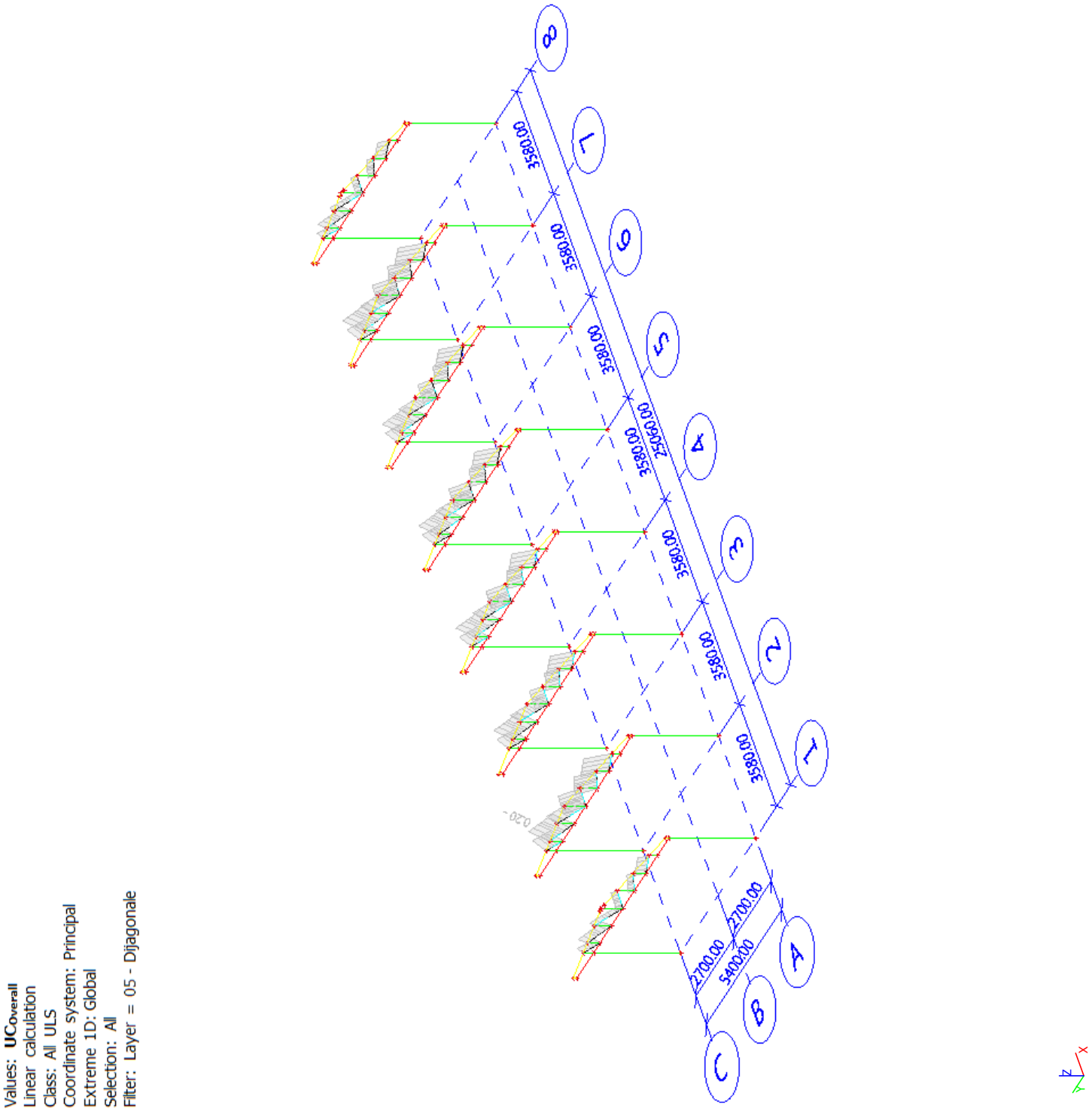
4.8. EC-EN 1993 Provera vertikala

Linearni proračun
Klasa: All ULS
Koordinatni sistem: Glavni
Ekstremni 1D: Globalni
Odabir: Svi
Filtar: Sloj = 04 - Vertikale
Ukupna Unity Provjera

Naziv	dx [m]	Slučaj	Poprečni presjek	Materijal	UC_{Ukupno} [-]	UC_{Sec} [-]	UC_{Stab} [-]
B41	0.00	ULS-Set B (auto)/1	40x40x3 - CFRHS40X40X3	S 235	**0.23**	0.23	0.00

Naziv	Kombinacijski ključ
ULS-Set B (auto)/1	1.35*g + 1.35*g1 + 1.50*s

4.9. EC-EN 1993 Steel check ULS; Ukupna provera_dijagonale



4.10. EC-EN 1993 Provera dijagonala

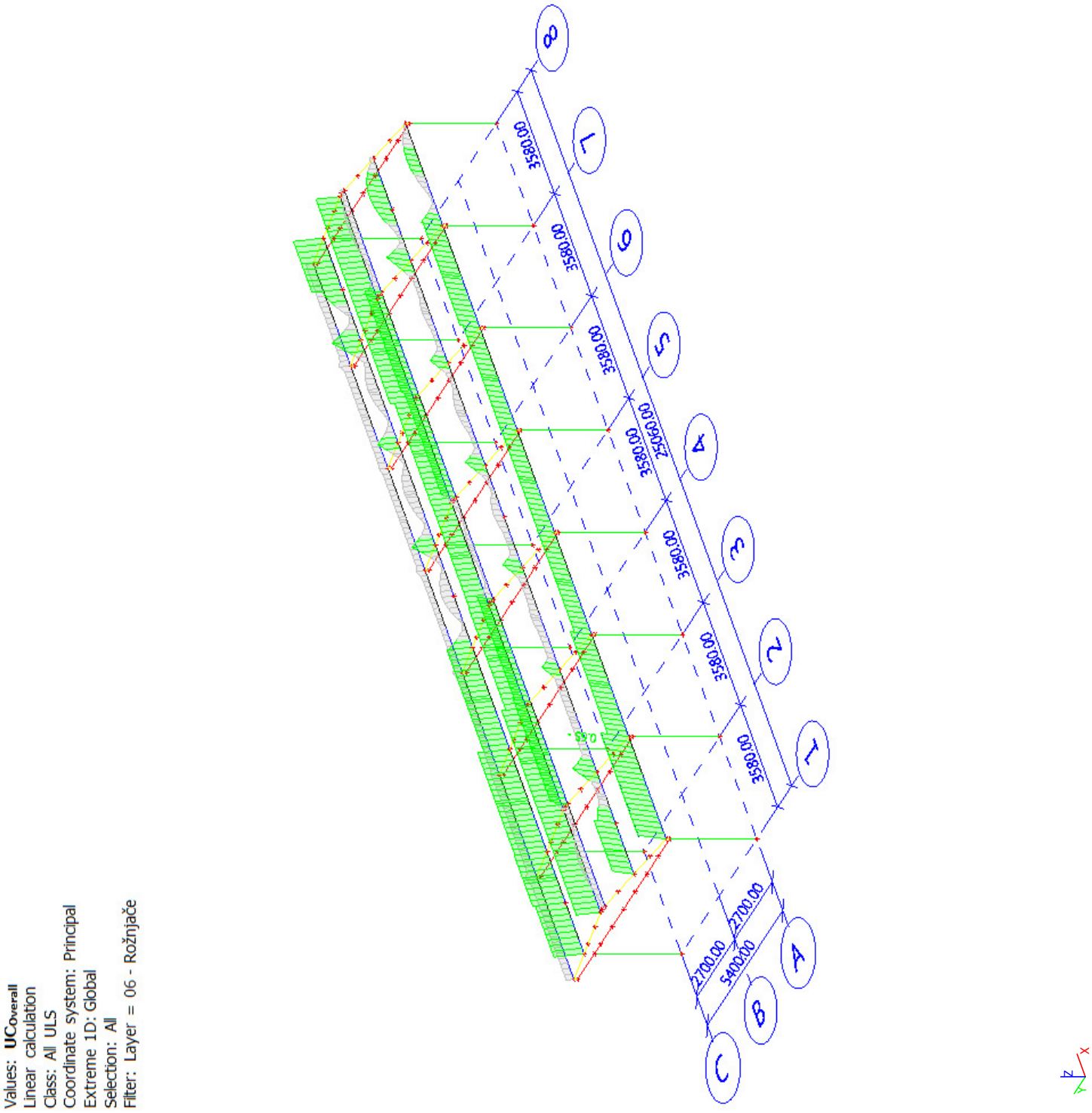
Linearni proračun
Klasa: All ULS
Koordinatni sistem: Glavni
Ekstremni 1D: Globalni
Odabir: Svi
Filtar: Sloj = 05 - Dijagonale

Ukupna Unity Provjera

Naziv	dx [m]	Slučaj	Poprečni presjek	Materijal	UC_{Ukupno} [-]	UC_{Sec} [-]	UC_{Stab} [-]
B52	0.00	ULS-Set B (auto)/1	40x40x3 - CFRHS40X40X3	S 235	**0.20**	0.20	0.00

Naziv	Kombinacijski ključ
ULS-Set B (auto)/1	1.35*g + 1.35*g1 + 1.50*s

4.11. EC-EN 1993 Steel check ULS; ukupna provera_rožnjače



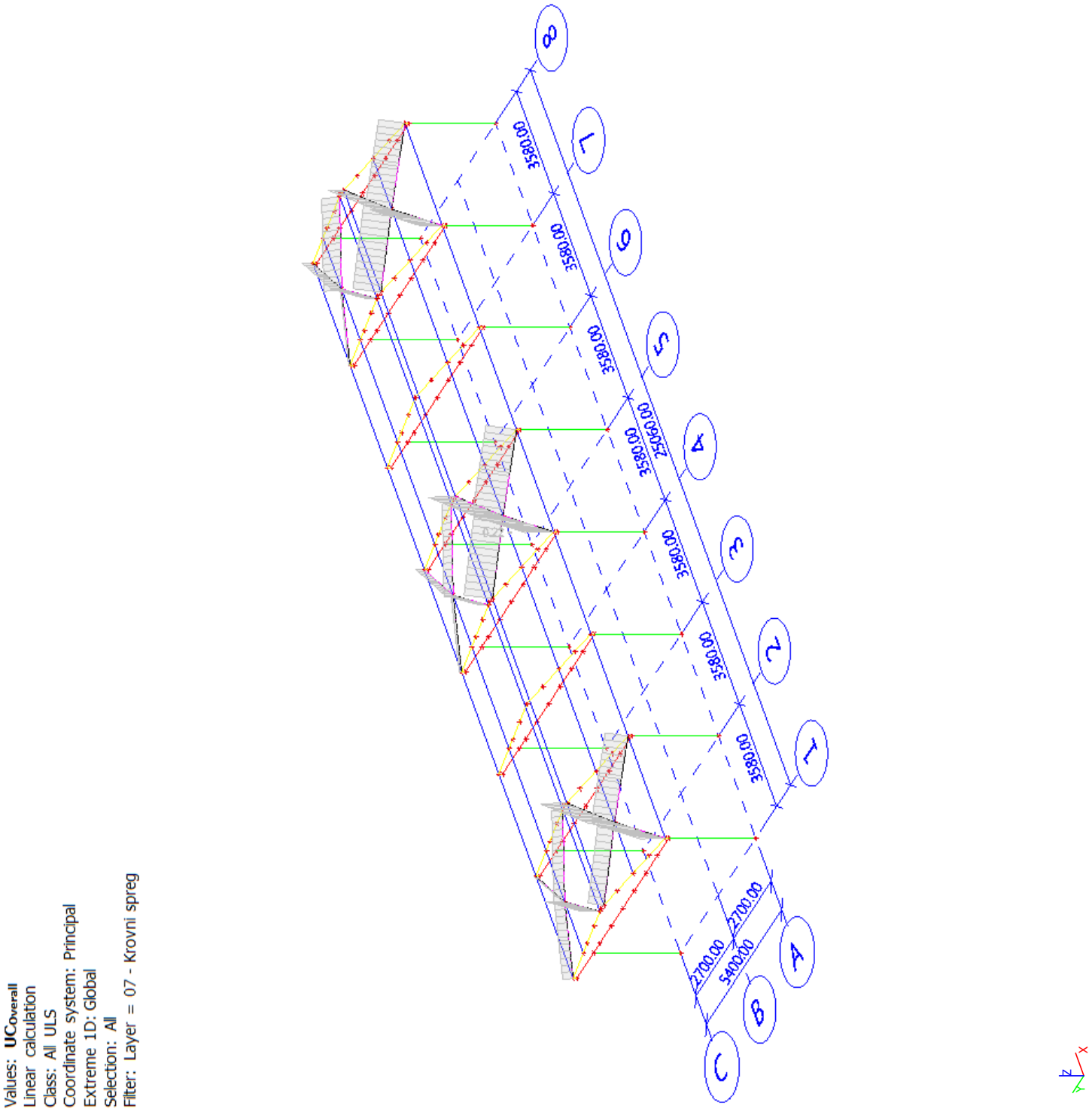
4.12. EC-EN 1993 Provera rožnjača

Linearni proračun
Klasa: All ULS
Koordinatni sistem: Glavni
Ekstremni 1D: Globalni
Odabir: Svi
Filtar: Sloj = 06 - Rožnjače
Ukupna Unity Provjera

Naziv	dx [m]	Slučaj	Poprečni presjek	Materijal	UC_{Ukupno} [-]	UC_{Sec} [-]	UC_{Stab} [-]
B162	3.58-	ULS-Set B (auto)/1	100x40x3 - CFRHS100X40X3	S 235	**0.65**	0.52	0.65

Naziv	Kombinacijski ključ
ULS-Set B (auto)/1	g + g1 + 1.50*wK

4.13. EC-EN 1993 Steel check ULS; Ukupna provera_krovni spreg



4.14. EC-EN 1993 Provera krovnog sprega

Linearni proračun
Klasa: All ULS
Koordinatni sistem: Glavni
Ekstremni 1D: Globalni
Odabir: Svi
Filtar: Sloj = 07 - Krovni spreg

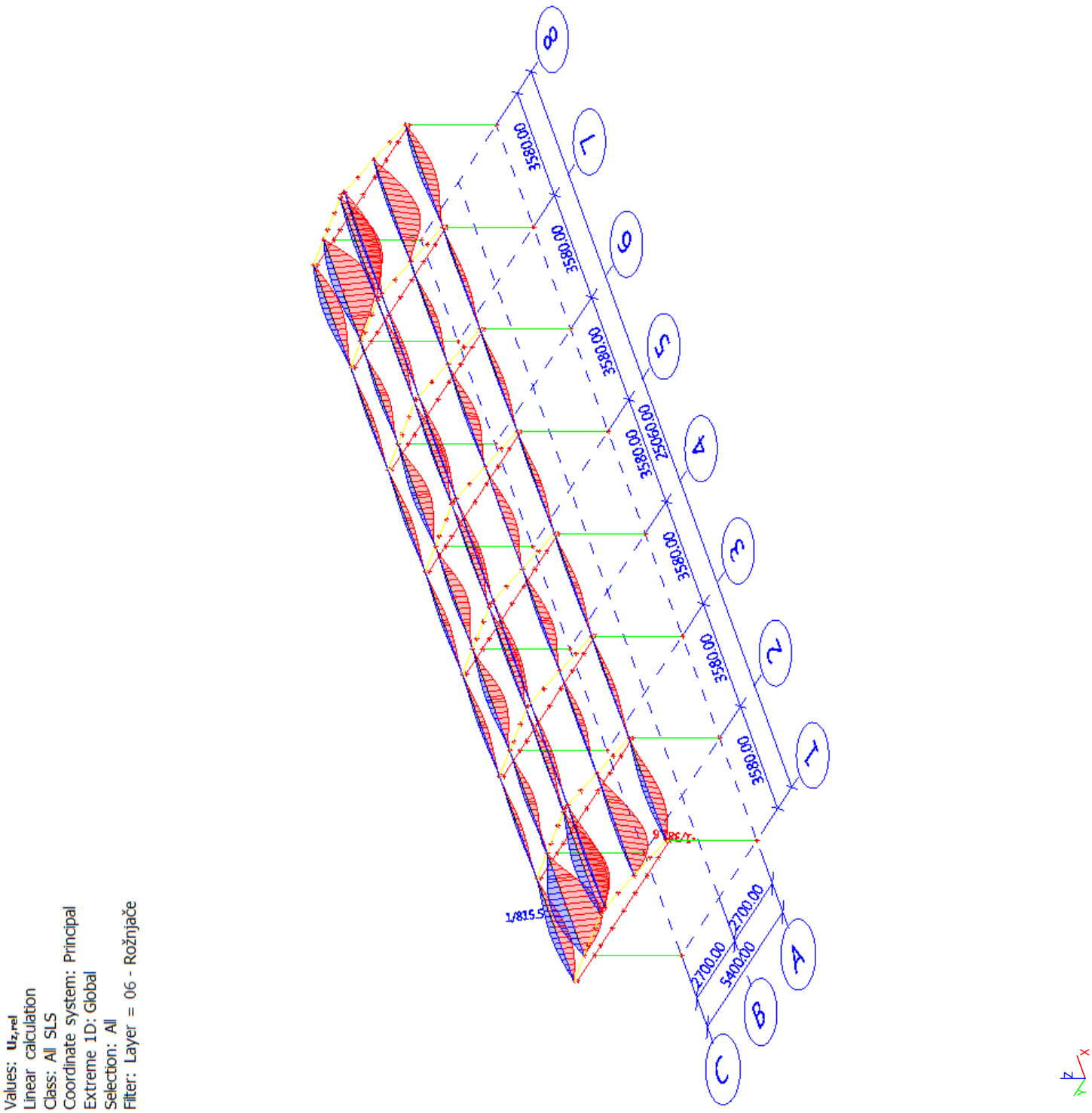
Ukupna Unity Provjera

Naziv	dx [m]	Slučaj	Poprečni presjek	Materijal	UC_{Ukupno} [-]	UC_{Sec} [-]	UC_{Stab} [-]
B188	0.00	ULS-Set B (auto)/1	40x40x3 - CFRHS40X40X3	S 235	**0.22**	0.05	0.22

Naziv	Kombinacijski ključ
ULS-Set B (auto)/1	1.35*g + 1.35*g1 + 1.50*s

5. Pomeranja

5.1. Ugib rožnjača

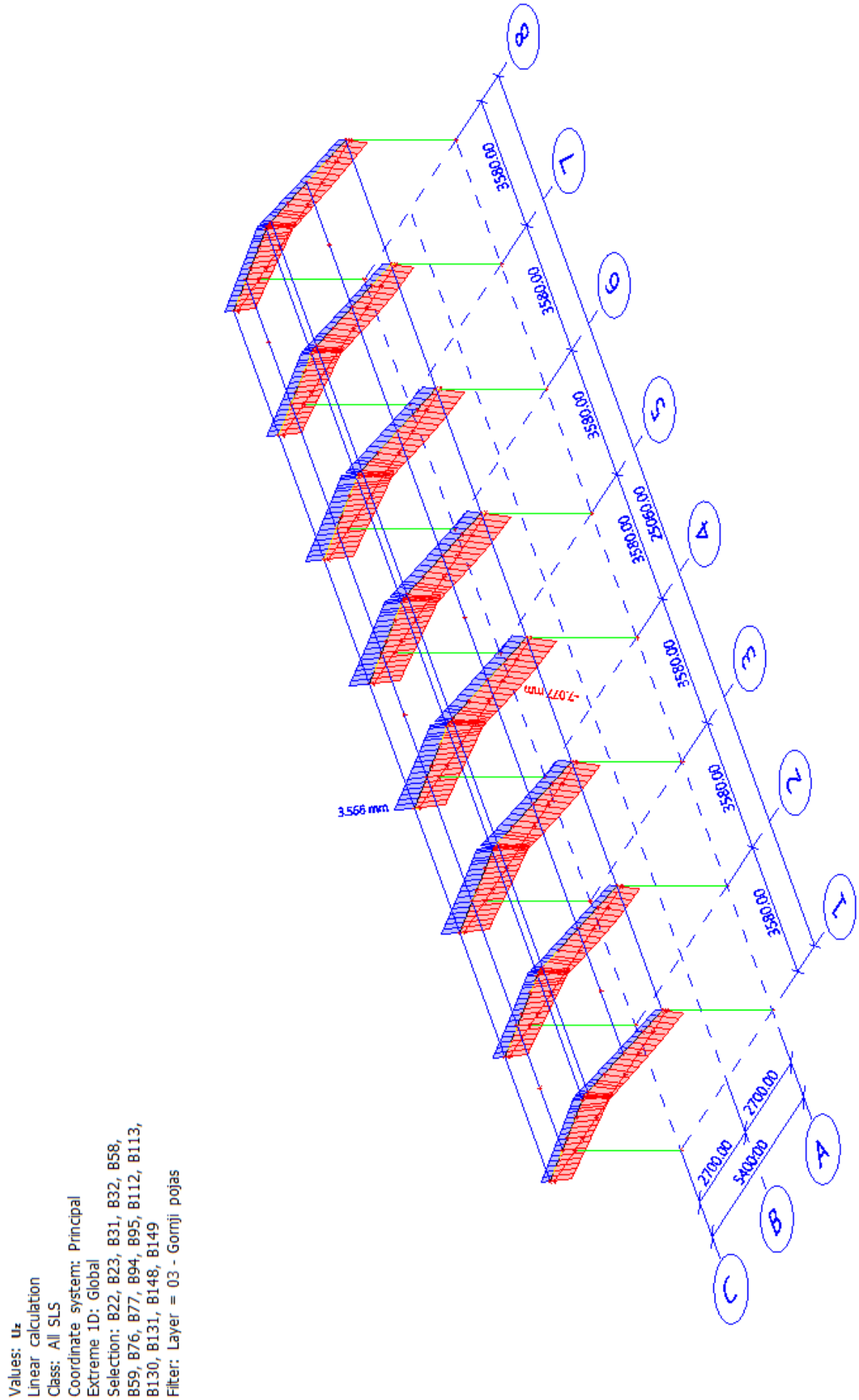


5.2. Ugib rožnjača

Linearni proračun
Klasa: All SLS
Koordinatni sistem: Glavni
Ekstremni 1D: Globalni
Odabir: Svi
Filtar: Sloj = 06 - Rožnjače
Relativne deformacije

Naziv	dx [m]	Slučaj	u_y [mm]	$u_{y,rel}$ [1/xx]	u_z [mm]	$u_{z,rel}$ [1/xx]
B166	19.78	SLS-Char (auto)/1	**-16.118**	**-1/222.1**	-0.475	-1/7543.2
B162	1.51	SLS-Char (auto)/2	**12.191**	**1/293.7**	1.390	1/2575.9
B163	1.59	SLS-Char (auto)/3	-0.154	-1/10000.0	**-9.382**	**-1/381.6**
B166	23.47	SLS-Char (auto)/4	-0.570	-1/3141.0	**4.390**	**1/815.5**

5.3. Ugib vrha objekta



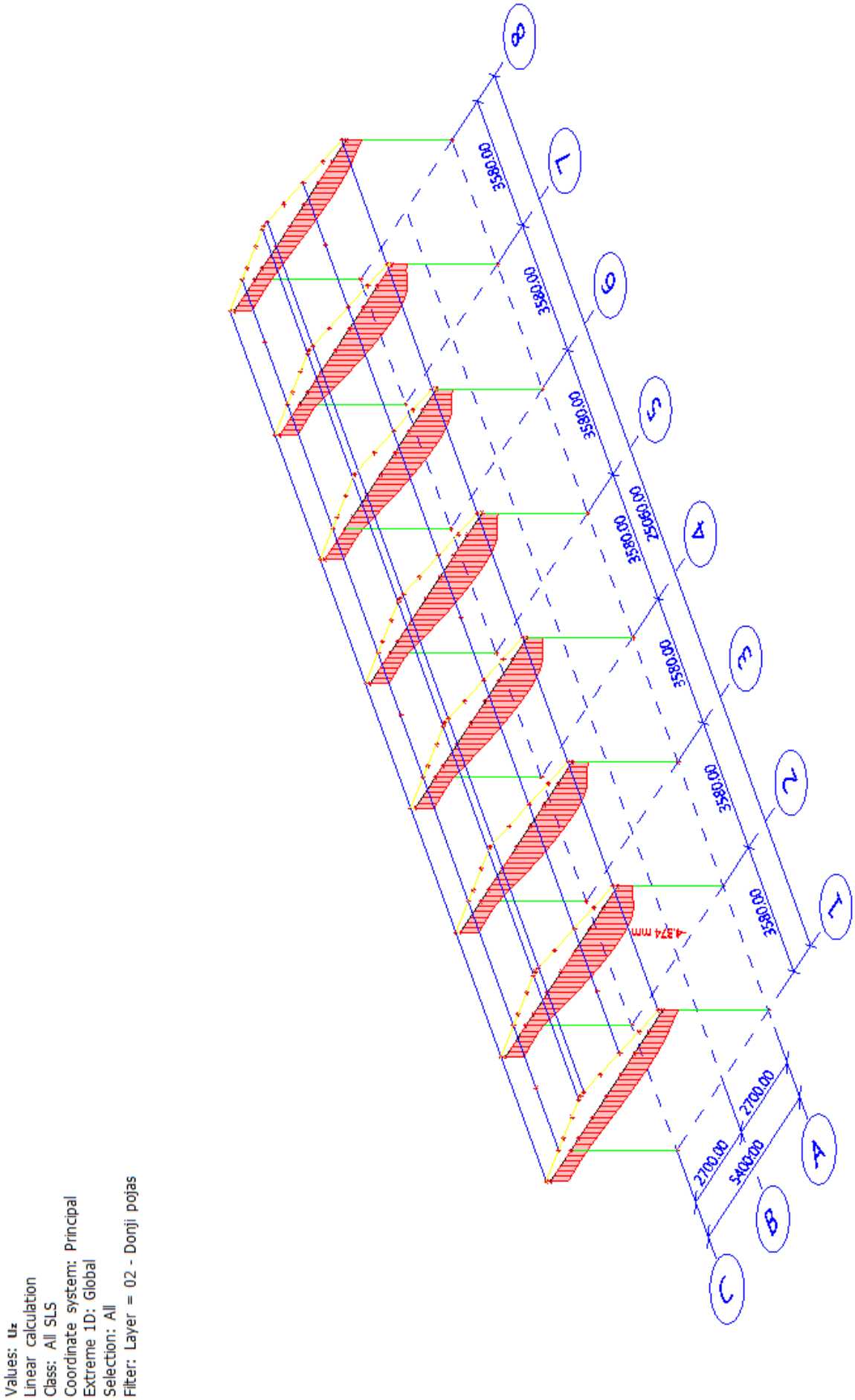
5.4. Ugib vrha objekta

Linearni proračun
Klasa: All SLS
Koordinatni sistem: Globalni
Ekstremni 1D: Globalni
Odabir: B22, B23, B31, B32, B58, B59, B76, B77, B94, B95, B112, B113, B130, B131, B148, B149
Deformacije

Naziv	dx [m]	Slučaj	u_x [mm]	u_y [mm]	u_z [mm]	φ_x [deg]	φ_y [deg]	φ_z [deg]	U_{ukupno} [mm]
B23	0.63	SLS-Char (auto)/1	**-1.042**	-17.808	-2.010	-0.019	0.041	0.007	17.951
B23	0.63	SLS-Char (auto)/2	**3.793**	8.686	-1.370	-0.009	0.028	0.007	9.576
B76	3.20-	SLS-Char (auto)/3	-0.009	**-24.772**	-2.197	0.013	0.000	0.001	24.869
B76	0.00	SLS-Char (auto)/4	-0.017	**26.785**	-1.324	0.011	0.000	0.002	26.817
B32	1.88	SLS-Char (auto)/5	-0.032	0.215	**-4.364**	-0.003	-0.026	-0.011	4.370
B22	0.00	SLS-Char (auto)/6	0.035	-17.801	**-0.570**	0.018	-0.048	-0.161	17.810
B32	0.42+	SLS-Char (auto)/5	-0.089	0.104	-2.572	**-0.127**	-0.029	-0.002	2.576
B31	1.88	SLS-Char (auto)/5	0.030	0.042	-2.720	**0.059**	-0.030	0.009	2.720
B22	0.00	SLS-Char (auto)/1	0.012	-17.760	-0.698	0.019	**-0.049**	-0.160	17.774
B22	0.00	SLS-Char (auto)/2	2.273	8.705	-1.342	0.001	**0.105**	0.139	9.096
B149	0.00	SLS-Char (auto)/7	0.017	19.344	-0.989	-0.016	-0.023	**-0.193**	19.369
B23	0.00	SLS-Char (auto)/7	-0.017	19.344	-0.989	-0.016	0.023	**0.193**	19.369
B77	1.47	SLS-Char (auto)/4	-0.011	26.778	-2.441	-0.011	0.000	0.000	**26.889**

Naziv	Kombinacijski ključ
SLS-Char (auto)/1	g + g1 + 0.50*s + wL
SLS-Char (auto)/2	g + g1 + wK
SLS-Char (auto)/3	g + g1 + 0.50*sD + wL
SLS-Char (auto)/4	g + g1 + 0.50*s + wD
SLS-Char (auto)/5	g + g1 + s
SLS-Char (auto)/6	g + g1 + wL
SLS-Char (auto)/7	g + g1 + wD

5.5. Ugib donjeg pojasa



5.6. Ugib donjeg pojasa

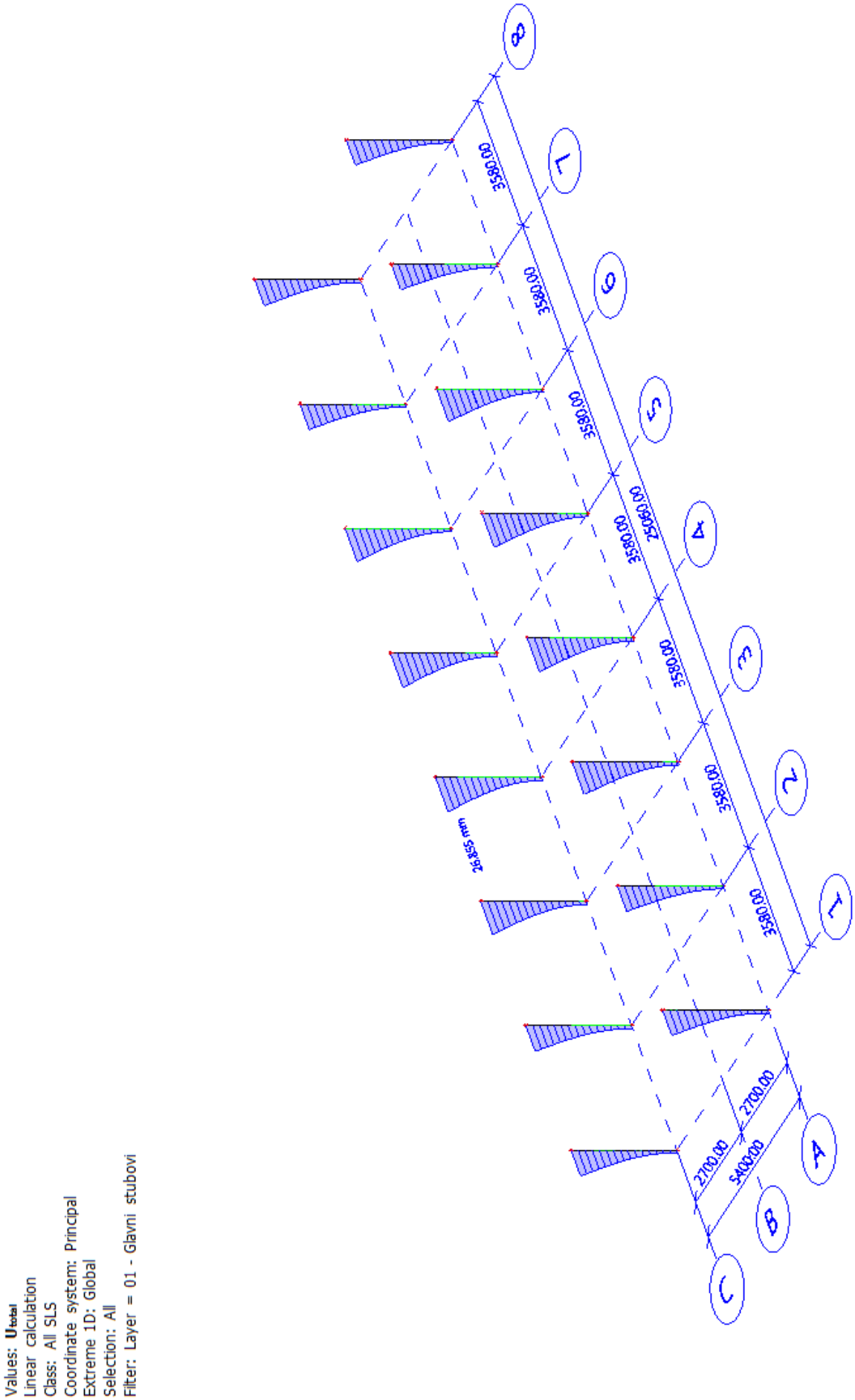
Linearni proračun
Klasa: All SLS
Koordinatni sistem: Globalni
Ekstremni 1D: Globalni
Odabir: Svi
Filtar: Sloj = 02 - Donji pojas

Deformacije

Naziv	dx [m]	Slučaj	u_x [mm]	u_y [mm]	u_z [mm]	φ_x [deg]	φ_y [deg]	φ_z [deg]	U_{ukupno} [mm]
B18	3.09	SLS-Char (auto)/1	**-12.975**	-17.770	-1.805	0.015	-0.080	0.014	22.077
B18	3.09	SLS-Char (auto)/2	**14.734**	8.727	-1.693	0.002	0.135	0.009	17.208
B72	0.00	SLS-Char (auto)/1	-0.029	**-24.758**	-1.535	-0.023	-0.001	-0.001	24.806
B72	4.95-	SLS-Char (auto)/3	0.004	**26.814**	-1.744	0.024	0.000	0.000	26.871
B27	2.06-	SLS-Char (auto)/4	-0.064	0.124	**-4.374**	0.002	-0.013	0.001	4.376
B144	6.60	SLS-Char (auto)/5	-0.144	-17.766	**-0.570**	0.018	0.061	0.222	17.776
B27	0.41+	SLS-Char (auto)/4	-0.018	-0.036	-2.579	**-0.126**	-0.015	0.002	2.579
B27	4.95-	SLS-Char (auto)/4	-0.058	0.320	-2.469	**0.062**	-0.009	-0.002	2.490
B18	5.40-	SLS-Char (auto)/6	-5.502	-17.722	-1.115	0.021	**-0.147**	-0.278	18.589
B18	5.40-	SLS-Char (auto)/7	7.089	8.701	-1.398	0.003	**0.189**	0.258	11.310
B144	0.82-	SLS-Char (auto)/5	4.481	-17.815	-1.805	-0.001	0.014	**-0.327**	18.458
B18	0.82-	SLS-Char (auto)/5	-4.481	-17.815	-1.805	-0.001	-0.014	**0.327**	18.458
B72	3.92	SLS-Char (auto)/3	-0.003	26.804	-2.142	0.018	0.000	-0.001	**26.889**

Naziv	Kombinacijski ključ
SLS-Char (auto)/1	g + g1 + 0.50*sD + wL
SLS-Char (auto)/2	g + g1 + 0.50*sL + wK
SLS-Char (auto)/3	g + g1 + 0.50*s + wD
SLS-Char (auto)/4	g + g1 + s
SLS-Char (auto)/5	g + g1 + wL
SLS-Char (auto)/6	g + g1 + 0.50*s + wL
SLS-Char (auto)/7	g + g1 + wK

5.7. Pomeranje vrha stuba



5.8. Pomeranje vrha stuba

Linearni proračun
Klasa: All SLS
Koordinatni sistem: Globalni
Ekstremni 1D: Globalni
Odabir: Svi
Filtar: Sloj = 01 - Glavni stubovi

Deformacije

Naziv	dx [m]	Slučaj	u_x [mm]	u_y [mm]	u_z [mm]	φ_x [deg]	φ_y [deg]	φ_z [deg]	U_{ukupno} [mm]
B2	2.80	SLS-Char (auto)/1	**-5.503**	-17.737	-1.062	0.505	-0.146	-0.278	18.601
B2	2.80	SLS-Char (auto)/2	**7.089**	8.701	-1.398	-0.262	0.189	0.258	11.310
B7	2.80	SLS-Char (auto)/1	-0.029	**-24.758**	-1.535	**0.682**	-0.001	-0.001	24.806
B8	2.80	SLS-Char (auto)/3	-0.008	0.278	**-2.141**	-0.006	-0.001	0.000	2.159
B8	2.80	SLS-Char (auto)/4	0.003	**26.809**	-1.565	**-0.739**	0.000	0.000	**26.855**
B2	2.24	SLS-Char (auto)/5	-4.001	-12.837	-1.111	0.485	**-0.156**	-0.223	13.492
B2	2.43	SLS-Char (auto)/2	5.825	7.002	-1.398	-0.257	**0.195**	0.224	9.215
B2	2.80	SLS-Char (auto)/6	-5.498	-17.771	-0.986	0.506	-0.146	**-0.279**	18.628
B16	2.80	SLS-Char (auto)/6	5.498	-17.771	**-0.986**	0.506	0.146	**0.279**	18.628

Naziv	Kombinacijski ključ
SLS-Char (auto)/1	g + g1 + 0.50*sD + wL
SLS-Char (auto)/2	g + g1 + wK
SLS-Char (auto)/3	g + g1 + s
SLS-Char (auto)/4	g + g1 + 0.50*s + wD
SLS-Char (auto)/5	g + g1 + 0.50*s + wL
SLS-Char (auto)/6	g + g1 + wL

6. Iskaz materijala

Odabir: Svi
Vrsta sortiranja: Materijal

Sažetak

Materijal	Masa [kg]	Površina [m^2]	Volumen [cm^3]
Čelik	2688.577	118.31	342493.920
Beton	67012.000	67.01	26804800.000
Ukupno	69700.577	185.33	27147293.920

Napomena: Vrijednost 'Površine' za 1D elemente predstavlja ukupnu izloženu površinu, dok za 2D elemente ona odgovara samo površini centralnog područja.

Čelik (1D)

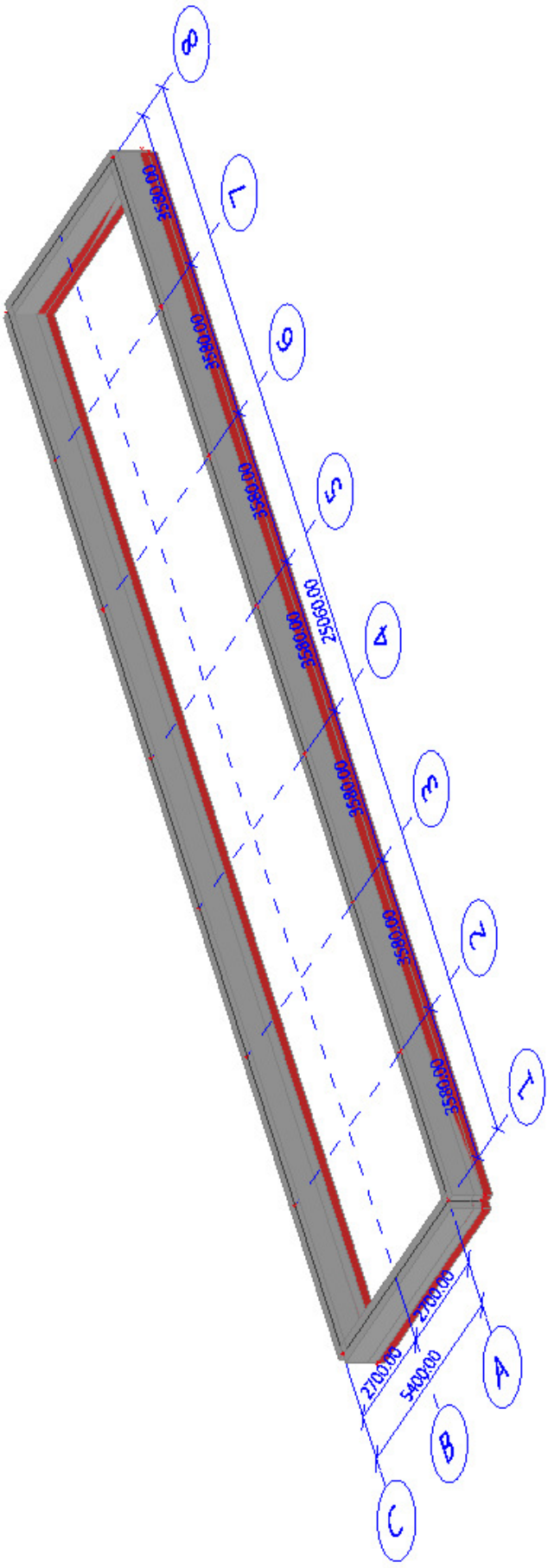
Materijal	Gustoća [kg/m^3]	Masa [kg]	Površina [m^2]	Volumen [cm^3]
S 235	7850.000	2688.577	118.31	342493.920
Ukupno		2688.577	118.31	342493.920

Beton (2D)

Materijal	Gustoća [kg/m^3]	Masa [kg]	Površina [m^2]	Volumen [cm^3]
C25/30	2500.000	67012.000	67.01	26804800.000
Ukupno		67012.000	67.01	26804800.000

7. Dimenzionisanje temelja

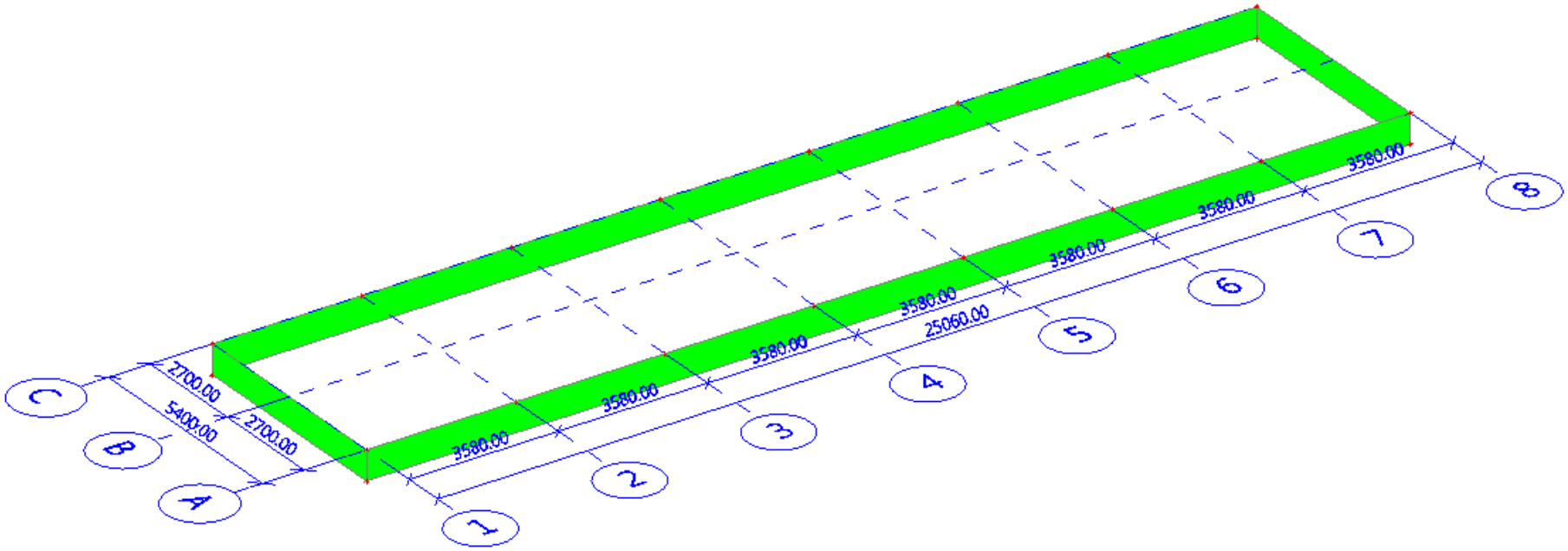
7.1. Izometrija temelja



7.2. Vrat temelja

7.3. Potrebna podužna armatura (ULS+SLS); As,req,1-

Values: $A_{s,req,1}$-
Linear calculation
Class: All ULS
Extreme: Global
Selection: All
Filter: Layer = 08 - Temeljne grede
Location: In nodes avg. on macro.
System: LCS mesh element

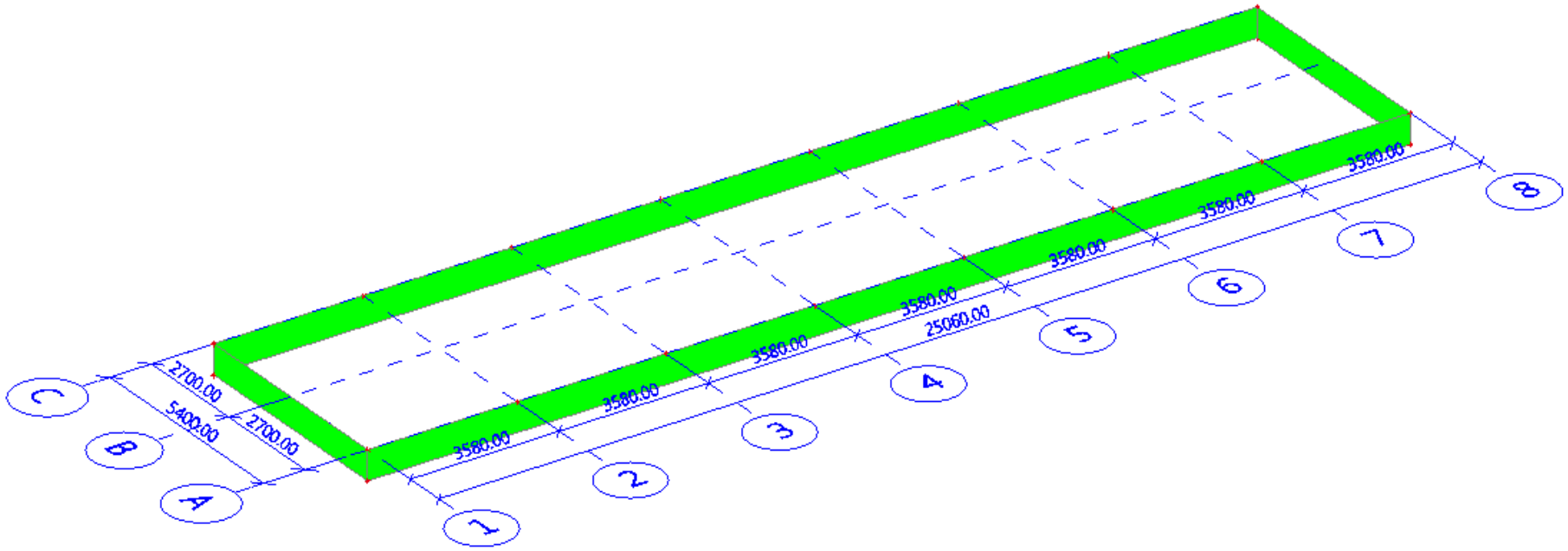


Constant value 5.03

$A_{s,req,1}$-[cm²/m]

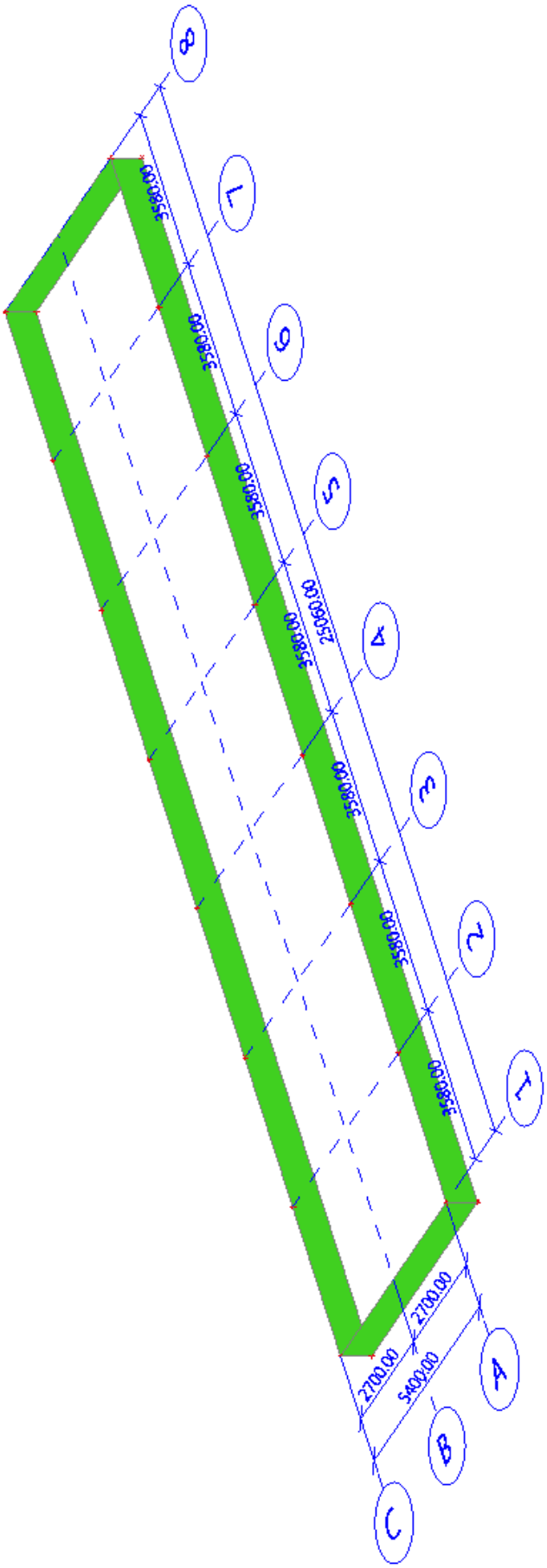
7.4. Potrebna poprečna armatura (ULS+SLS); As,req,2-

Values: $A_{s,req,2-}$
Linear calculation
Class: All ULS
Extreme: Global
Selection: All
Filter: Layer = 08 - Temeljne grede
Location: In nodes avg. on macro.
System: LCS mesh element



Constant value 4.00
$A_{s,req,2-}$ [cm²/m]

7.5. Usvojena podužna armatura (ULS+SLS); As,prov,1-

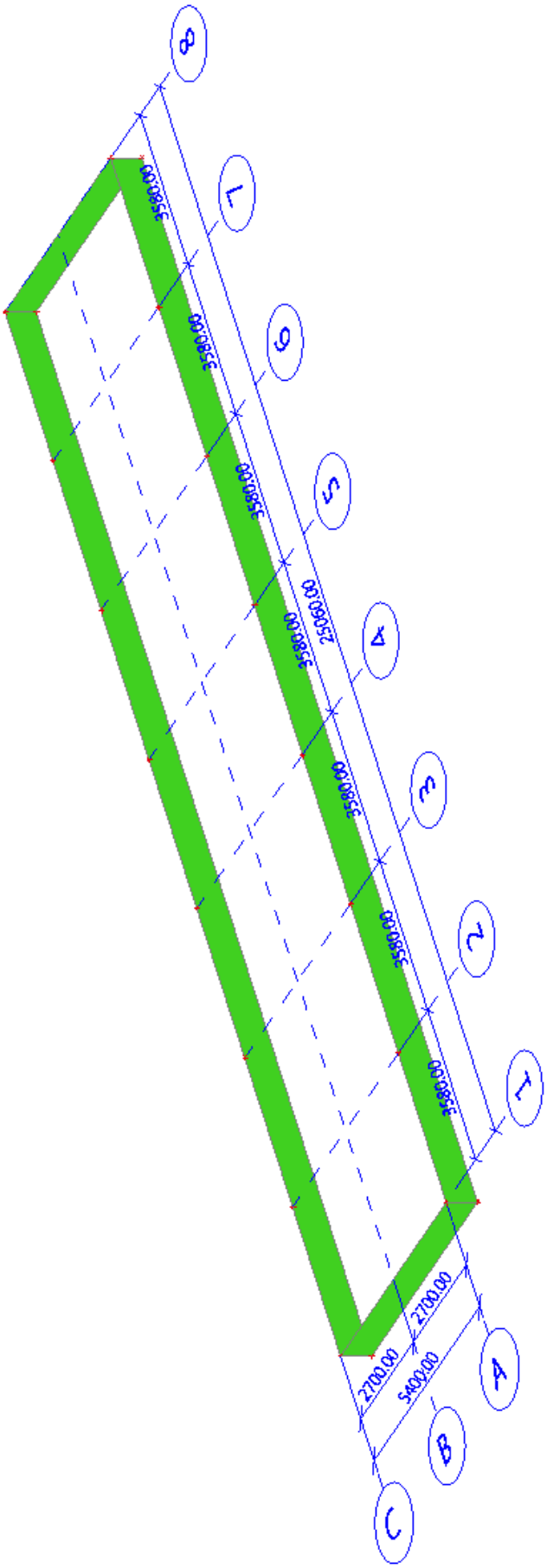


Values: **Reinf** Prov,1-
Linear calculation
Class: All ULS
Extreme: Global
Selection: All
Filter: Layer = 08 - Temeljne grede
Location: In nodes avg. on macro.
System: LCS mesh element

Reinf Prov,1-

ϕ16/300

7.6. Usvojena poprečna armatura (ULS+SLS); As,prov,2-



Values: **Reinf** Prov,2-
Linear calculation
Class: All ULS
Extreme: Global
Selection: All
Filter: Layer = 08 - Temeljne grede
Location: In nodes avg. on macro.
System: LCS mesh element

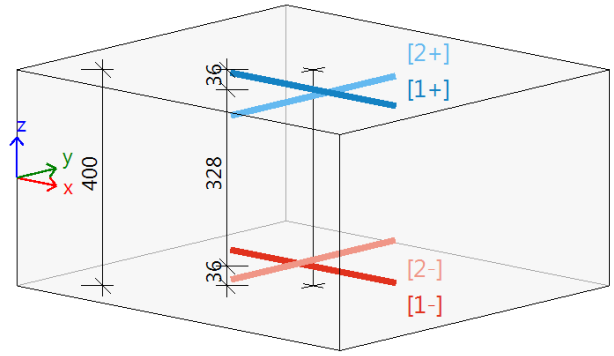
Reinf Prov,2-

ϕ10/150

7.7. Izveštaj armiranja temelja

Linearni proračun
Klasa: All ULS+SLS
Ekstrem: Globalni
Odabir: Svi
Filtar: Sloj = 08 - Temeljne grede
Položaj: U čvorova prosj. na makro. Sustav: Element mreže LCS

Zid S2	**h=400 mm**
EC EN 1992-1-1:2004/AC:2008	Čvor 11/27 [X= 25.060, Y=5.400, Z=0.000 m]



Beton: C25/30
Dvosmjerni dijagram naprezanja i deformacije
Razred izloženosti: XC3
Zaštitni sloj 30 mm

Armatura: B 500B
Dvosmjerni s nagnutim vrhom grana
[1+] ϕ16/300
[2+] ϕ10/150
[1-] ϕ16/300
[2-] ϕ10/150

Projektirana širina: b = 1.0 m

Uzdužna armatura

	Osnovno	Dodatno		$A_{s,ult}$	$\Delta A_{s,serv}$	$A_{s,min}$	$A_{s,req}$	$A_{s,prov}$	$A_{s,max}$	Status
		Korisnički	Osigurano	[mm^2]	[mm^2]	[mm^2]	[mm^2]	[mm^2]	[mm^2]	
[1+]	**ϕ16/300**	bez armat.	bez armat.	364	0	503	**503**	**670**	3794	**U REDU**
[2+]	**ϕ10/150**	bez armat.	bez armat.	50	0	400	**400**	**524**	1671	**U REDU**
[1-]	**ϕ16/300**	bez armat.	bez armat.	345	0	503	**503**	**670**	3794	**U REDU**
[2-]	**ϕ10/150**	bez armat.	bez armat.	107	0	400	**400**	**524**	1671	**U REDU**

$A_{s,ult}$ - potrebna površina armature prema proračunu GSN; $\Delta A_{s,serv}$ - povećanje potrebne površine armature prema GSU proračunu; $A_{s,req}$ - potrebna površina armature uključujući detalje; $A_{s,prov}$ - osigurana površina armature (zbroj od promatranih)

Granično stanje nosivosti

Proračunato u smjerovima slojeva armature:

	Slučaj	α_s [°]	m_{Ed} [kNm]	n_{Ed} [kN]	d [mm]	x [mm]	z [mm]	F_{cd} [kN]	F_{sd} [kN]	$A_{s,ult}$ [mm^2]
[1+]	ULS-Set B (auto)/10	0.0	**-1.69**	**305.96**	364.0	0.0	327.6	0.0	158.1	**364**
[2+]	ULS-Set B (auto)/2	90.0	**-3.18**	**22.41**	352.0	0.0	316.8	0.0	21.7	**50**
[1-]	ULS-Set B (auto)/5	0.0	**-1.27**	**307.66**	364.0	0.0	327.6	0.0	150.0	**345**
[2-]	ULS-Set B (auto)/4	90.0	**14.26**	**10.58**	352.0	2.9	350.9	-36.1	46.6	**107**

α_s - smjer armaturnog sloja; m_{Ed}, n_{Ed} - ponovno proračunato projektirano opterećenje, F_{cd} - sila otpornosti u betonu; F_{sd} - sila otpornosti u armaturi; $A_{s,ult}$ - potrebna površina armature prema proračunu GSN (>10 mm^2)

ULS-Set B (auto)/5	1.35*g+1.35*g1+0.75*s+1.50*wD
ULS-Set B (auto)/4	g+g1+1.50*wL
ULS-Set B (auto)/10	1.35*g+1.35*g1+0.75*sD+1.50*wD
ULS-Set B (auto)/2	g+g1+1.50*wD

Granično stanje uporabljivosti

Proračunato u smjerovima glavnih naprezanja:

		α_σ		m_{Ed}	n_{Ed}	$A_{s,ult,\sigma}$	$A_{s,serv,\sigma}$	σ_{ct}	σ_s	w_k	$\Delta A_{s,serv}$
	Slučaj	**[°]**		**[kNm]**	**[kN]**	**[mm²]**	**[mm²]**	**[MPa]**	**[MPa]**	**[mm]**	**[mm²]**
σ_I[+]	SLS-Char (auto)/21	-7.7	Ch	**3.38**	**7.30**	358	358	-0.01	0.1	0.000	**Δ_{1+}=0**
			Qp	**0.10**	**45.32**			≤ 2.60	≤ 400.0	≤ 0.300	**Δ_{2+}=0**
σ_{II}[+]	SLS-Char (auto)/21	82.3	Ch	**4.38**	**-9.07**	56	56	-0.20	-0.1	0.000	**Δ_{1+}=0**
			Qp	**0.25**	**-12.63**			≤ 2.60	≤ 400.0	≤ 0.300	**Δ_{2+}=0**
σ_I[-]	SLS-Char (auto)/21	-1.1	Ch	**3.85**	**7.27**	345	345	0.26	0.1	0.000	**Δ_{1-}=0**
			Qp	**0.12**	**46.38**			≤ 2.60	≤ 400.0	≤ 0.300	**Δ_{2-}=0**
σ_{II}[-]	SLS-Char (auto)/21	88.9	Ch	**3.91**	**-9.04**	107	107	0.11	-0.1	0.000	**Δ_{1-}=0**
			Qp	**0.24**	**-13.69**			≤ 2.60	≤ 400.0	≤ 0.300	**Δ_{2-}=0**

α_σ - smjer glavnog naprezanja; m_{Ed}, n_{Ed} - ponovno proračunato projektirano opterećenje; $A_{s,ult/serv,\sigma}$ - ponovno proračunata potrebna površina armature prema GSU/GSN proračunu; σ_{ct} - maksimalno vlačno naprezanje u betonu (provjera s σ_{cr}), σ_s - naprezanja u vlačnoj armaturi (provjereno s $\sigma_{s,lim}$); w_k - širina pukotine (provjereno s w_{max}); $\Delta A_{s,serv}$ - povećanje potrebne površine armature prema GSU proračunu (>10 mm²)

SLS-Char (auto)/21	Ch	g+g1+0.50*sL+wK
	Qp	g+g1

Posmična armatura

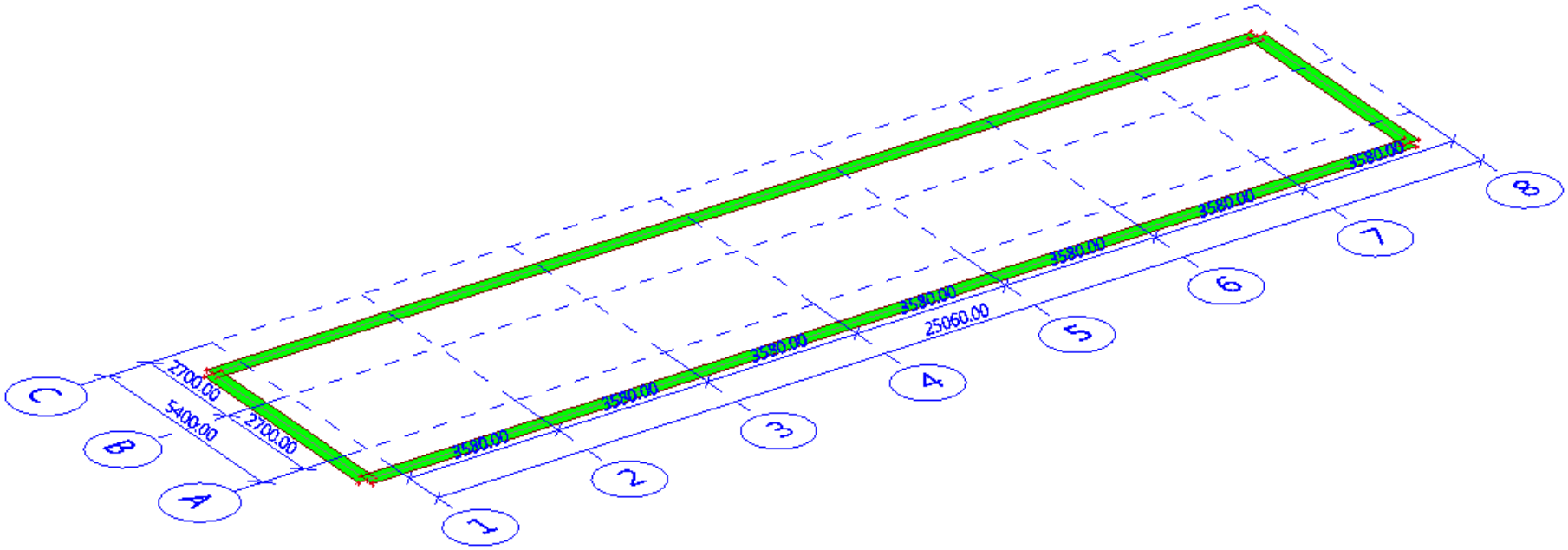
		θ	v_{Ed}	$A_{sl,x}$	$A_{sl,y}$	ρ_l	$v_{Rd,c}$	$v_{Rd,max}$	$A_{sw,req}$	Status
	Slučaj	**[°]**	**[kN/m]**	**[mm²]**	**[mm²]**	**[%]**	**[kN/m]**	**[kN/m]**	**[mm²/m²]**	
[-]	ULS-Set B (auto)	40.0	**115.1**	1340	1048	0.331	171.1	1568.7	---	**U REDU**

v_{Ed} - proračun posmične sile, $A_{sl,x/y}$ - vlačna uzdužna armatura, ρ_l - odgovarajući armaturni omjer, v_{Rdc} - otpornost na posmik bez posmične armatura, $v_{Rd,max}$ - maksimalna posmična otpornost betona, $A_{sw,req}$ - potrebna posmična armatura

7.8. Stopa temelja

7.9. Potrebna podužna armatura (ULS+SLS); As,req,1-

Values: $A_{s,req,1}$-
Linear calculation
Class: All ULS
Extreme: Global
Selection: All
Filter: Layer = 09 - Stope temelja
Location: In nodes avg. on macro.
System: LCS mesh element

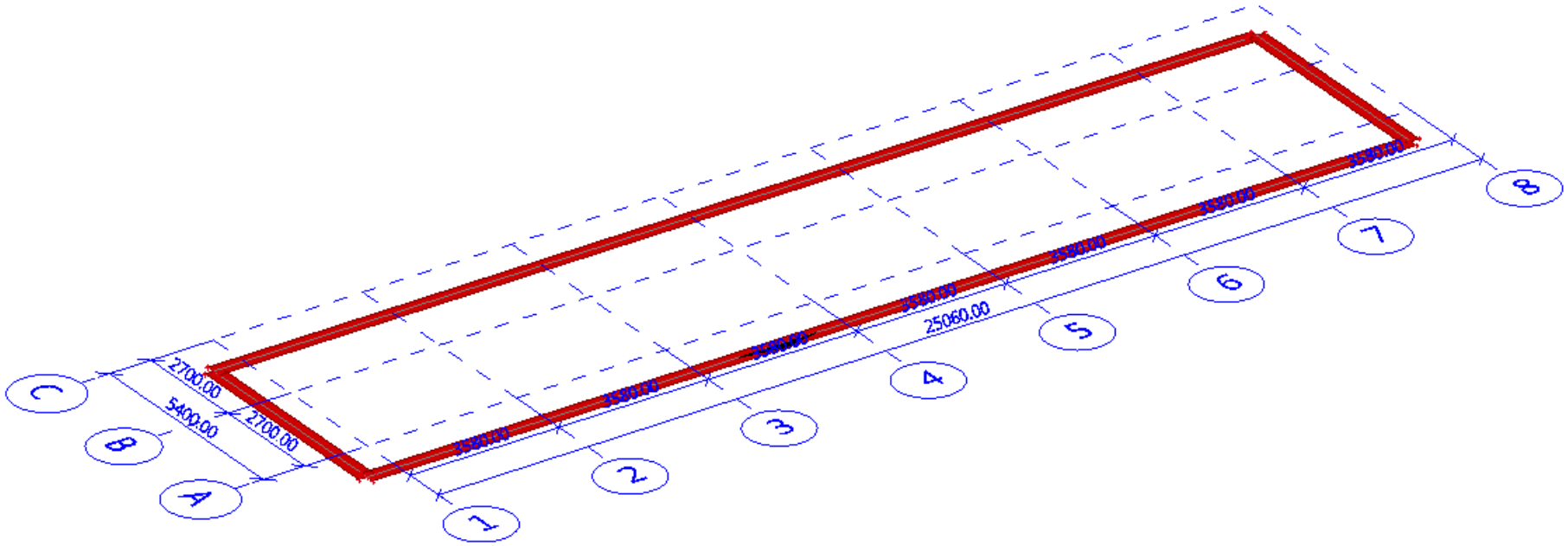


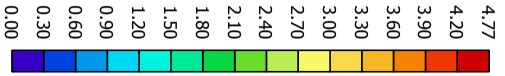
Constant value 4.92

$A_{s,req,1}$-[cm²/m]

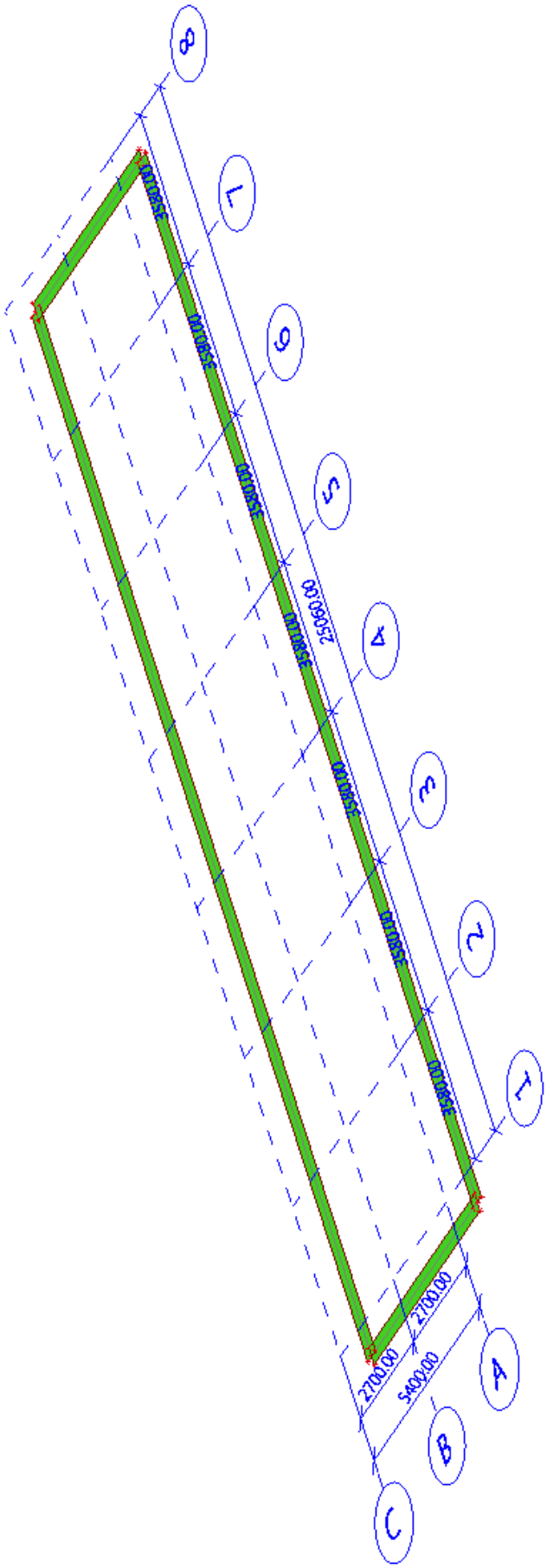
7.10. Potrebna poprečna armatura (ULS+SLS); As,req,2-

Values: $A_{s,req,2-}$
Linear calculation
Class: All ULS
Extreme: Global
Selection: All
Filter: Layer = 09 - Stope temelja
Location: In nodes avg. on macro.
System: LCS mesh element





7.11. Usvojena podužna armatura (ULS+SLS); As,prov,1-

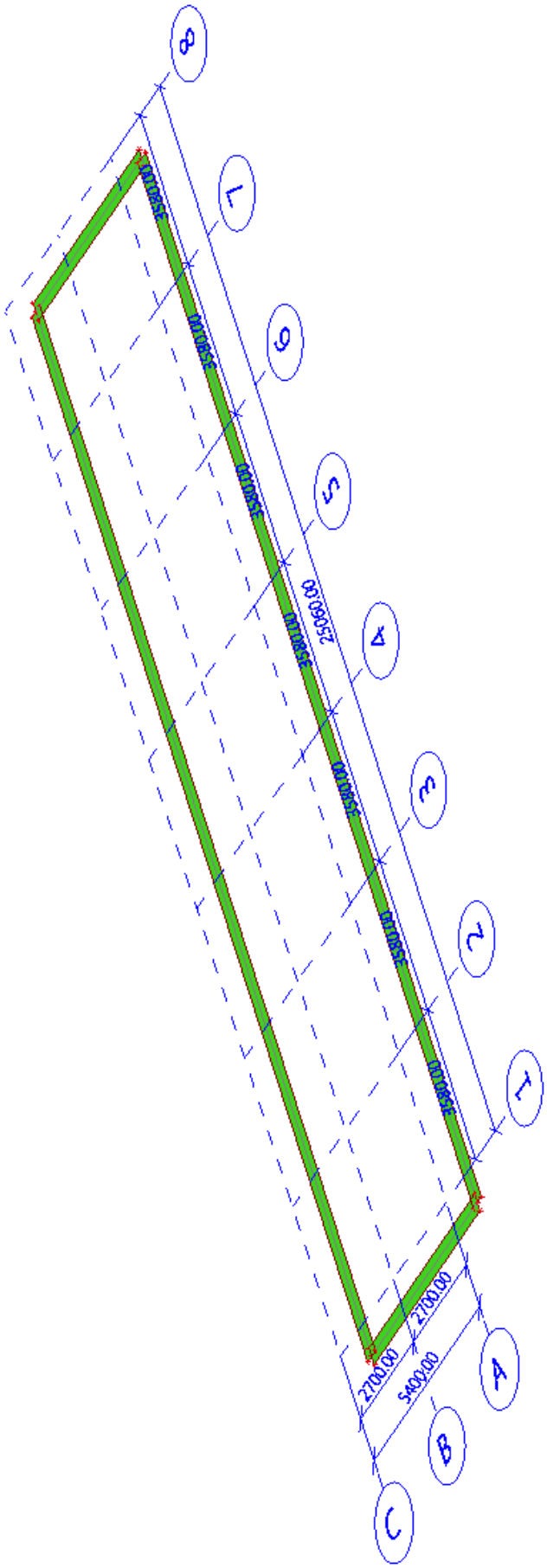


Values: **Reinf** Prov,1-
Linear calculation
Class: All ULS
Extreme: Global
Selection: All
Filter: Layer = 09 - Stope temelja
Location: In nodes avg. on macro.
System: LCS mesh element

Reinf Prov,1-

ϕ12/150

7.12. Usvojena poprečna armatura (ULS+SLS); As,prov,2-



Values: **Reinf** Prov,2-
Linear calculation
Class: All ULS
Extreme: Global
Selection: All
Filter: Layer = 09 - Stope temelja
Location: In nodes avg. on macro.
System: LCS mesh element

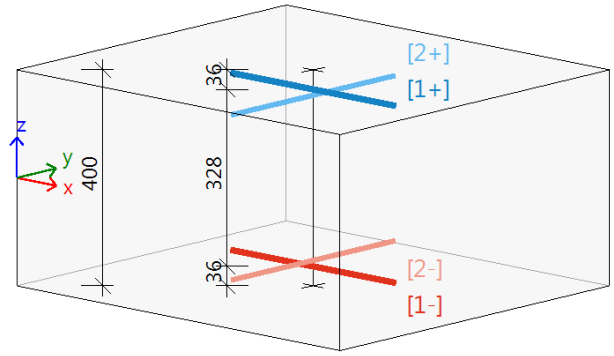
Reinf Prov,2-

ϕ10/150

7.13. Izveštaj armiranja stopa

Linearni proračun
Klasa: All ULS+SLS
Ekstrem: Globalni
Odabir: Svi
Filtar: Sloj = 09 - Stope temelja
Položaj: U čvorova prosj. na makro. Sustav: Element mreže LCS

Ploča S6	**h=400 mm**
EC EN 1992-1-1:2004/AC:2008	Čvor 14/326 [X= 0.000, Y=5.400, Z=-0.700 m]



Beton: C25/30
Dvosmjerni dijagram naprezanja i deformacije
Razred izloženosti: XC3
Zaštitni sloj 30 mm

Armatura: B 500B
Dvosmjerni s nagnutim vrhom grana
[1+] ϕ12/150
[2+] ϕ10/150
[1-] ϕ12/150
[2-] ϕ10/150

Projektirana širina: b = 1.0 m

Uzdužna armatura

	Osnovno	Dodatno		$A_{s,ult}$	$\Delta A_{s,serv}$	$A_{s,min}$	$A_{s,req}$	$A_{s,prov}$	$A_{s,max}$	Status
		Korisnički	Osigurano	[mm²]	[mm²]	[mm²]	[mm²]	[mm²]	[mm²]	
[1+]	**ϕ12/150**	bez armat.	bez armat.	193	0	492	**492**	**754**	2308	**U REDU**
[2+]	**ϕ10/150**	bez armat.	bez armat.	273	0	477	**477**	**524**	1671	**U REDU**
[1-]	**ϕ12/150**	bez armat.	bez armat.	156	0	492	**492**	**754**	2308	**U REDU**
[2-]	**ϕ10/150**	bez armat.	bez armat.	200	0	477	**477**	**524**	1671	**U REDU**

$A_{s,ult}$ - potrebna površina armature prema proračunu GSN; $\Delta A_{s,serv}$ - povećanje potrebne površine armature prema GSU proračunu; $A_{s,req}$ - potrebna površina armature uključujući detalje; $A_{s,prov}$ - osigurana površina armature (zbroj od promatranih)

Granično stanje nosivosti

Proračunato u smjerovima slojeva armature:

	Slučaj	α_s [°]	m_{Ed} [kNm]	n_{Ed} [kN]	d [mm]	x [mm]	z [mm]	F_{cd} [kN]	F_{sd} [kN]	$A_{s,ult}$ [mm²]
[1+]	ULS-Set B (auto)	0.0	**-2.62**	**151.87**	364.0	0.0	327.6	0.0	83.9	**193**
[2+]	ULS-Set B (auto)	90.0	**-4.84**	**205.40**	353.0	0.0	317.7	0.0	118.5	**273**
[1-]	ULS-Set B (auto)	0.0	**-2.51**	**151.28**	364.0	0.0	327.6	0.0	68.0	**156**
[2-]	ULS-Set B (auto)	90.0	**-4.84**	**205.40**	353.0	0.0	317.7	0.0	86.9	**200**

α_s - smjer armaturnog sloja; m_{Ed}, n_{Ed} - ponovno proračunato projektirano opterećenje, F_{cd} - sila otpornosti u betonu; F_{sd} - sila otpornosti u armaturi; $A_{s,ult}$ - potrebna površina armature prema proračunu GSN (>10 mm²)

ULS-Set B (auto)	1.35*g+1.35*g1+0.75*sD+1.50*wD
ULS-Set B (auto)	1.35*g+1.35*g1+0.75*s+1.50*wD

Granično stanje uporabljivosti

Proračunato u smjerovima glavnih naprezanja:

	Slučaj	α_σ [°]		m_{Ed} [kNm]	n_{Ed} [kN]	$A_{s,ult,\sigma}$ [mm^2]	$A_{s,serv,\sigma}$ [mm^2]	σ_{ct} [MPa]	σ_s [MPa]	w_k [mm]	$\Delta A_{s,serv}$ [mm^2]
σ_I[+]	SLS-Char (auto)/21	-114.2	Ch	**4.67**	**1.38**	259	259	-0.40	0.0	0.000	Δ_{1+}=**0**
			Qp	**0.00**	**-92.53**			≤ 2.60	≤ 400.0	≤ 0.300	Δ_{2+}=**0**
σ_{II}[+]	SLS-Char (auto)/21	-24.2	Ch	**-1.76**	**1.05**	206	206	-0.02	0.0	0.000	Δ_{1+}=**0**
			Qp	**0.17**	**-33.02**			≤ 2.60	≤ 400.0	≤ 0.300	Δ_{2+}=**0**
σ_I[-]	SLS-Char (auto)/21	6.7	Ch	**4.65**	**2.03**	157	157	0.05	0.1	0.000	Δ_{1-}=**0**
			Qp	**0.19**	**-50.58**			≤ 2.60	≤ 400.0	≤ 0.300	Δ_{2-}=**0**
σ_{II}[-]	SLS-Char (auto)/21	96.7	Ch	**-1.74**	**0.40**	199	199	-0.25	0.0	0.000	Δ_{1-}=**0**
			Qp	**-0.01**	**-74.98**			≤ 2.60	≤ 400.0	≤ 0.300	Δ_{2-}=**0**

α_σ - smjer glavnog naprezanja; m_{Ed}, n_{Ed} - ponovno proračunato projektirano opterećenje; $A_{s,ult/serv,\sigma}$ - ponovno proračunata potrebna površina armature prema GSU/GSN proračunu; σ_{ct} - maksimalno vlačno naprezanje u betonu (provjera s σ_{cr}), σ_s - naprezanja u vlačnoj armaturi (provjereno s $\sigma_{s,lim}$); w_k - širina pukotine (provjereno s w_{max}); $\Delta A_{s,serv}$ - povećanje potrebne površine armature prema GSU proračunu (>10 mm^2)

SLS-Char (auto)/21	Ch	g+g1+0.50*sL+wL
	Qp	g+g1

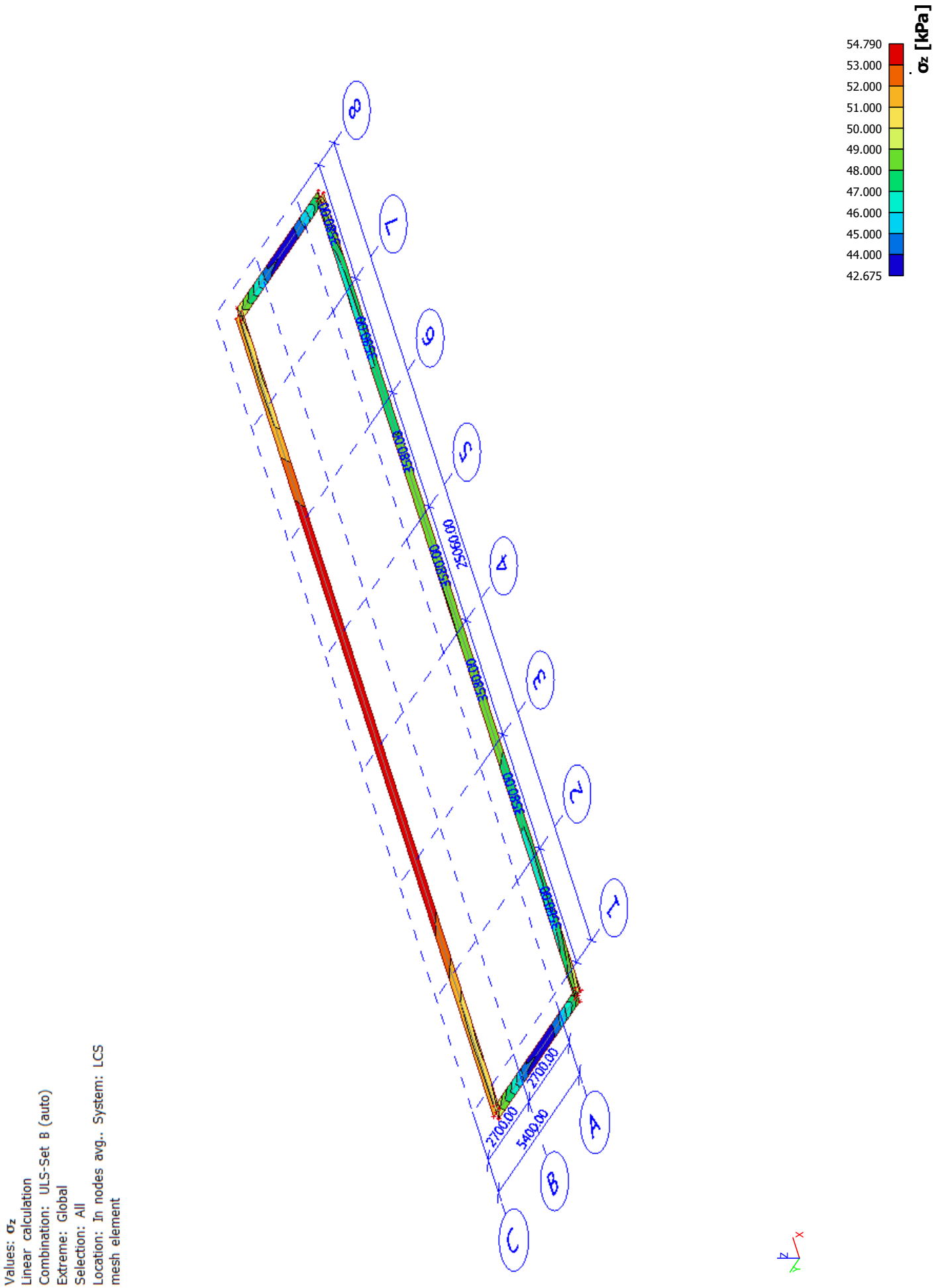
Posmična armatura

	Slučaj	θ [°]	v_{Ed} [kN/m]	$A_{sl,x}$ [mm^2]	$A_{sl,y}$ [mm^2]	ρ_l [%]	$v_{Rd,c}$ [kN/m]	$v_{Rd,max}$ [kN/m]	$A_{sw,req}$ [mm^2/m^2]	Status
[-]	ULS-Set B (auto)	40.0	**136.8**	754	524	0.175	129.4	1585.1	**800**	**U REDU**

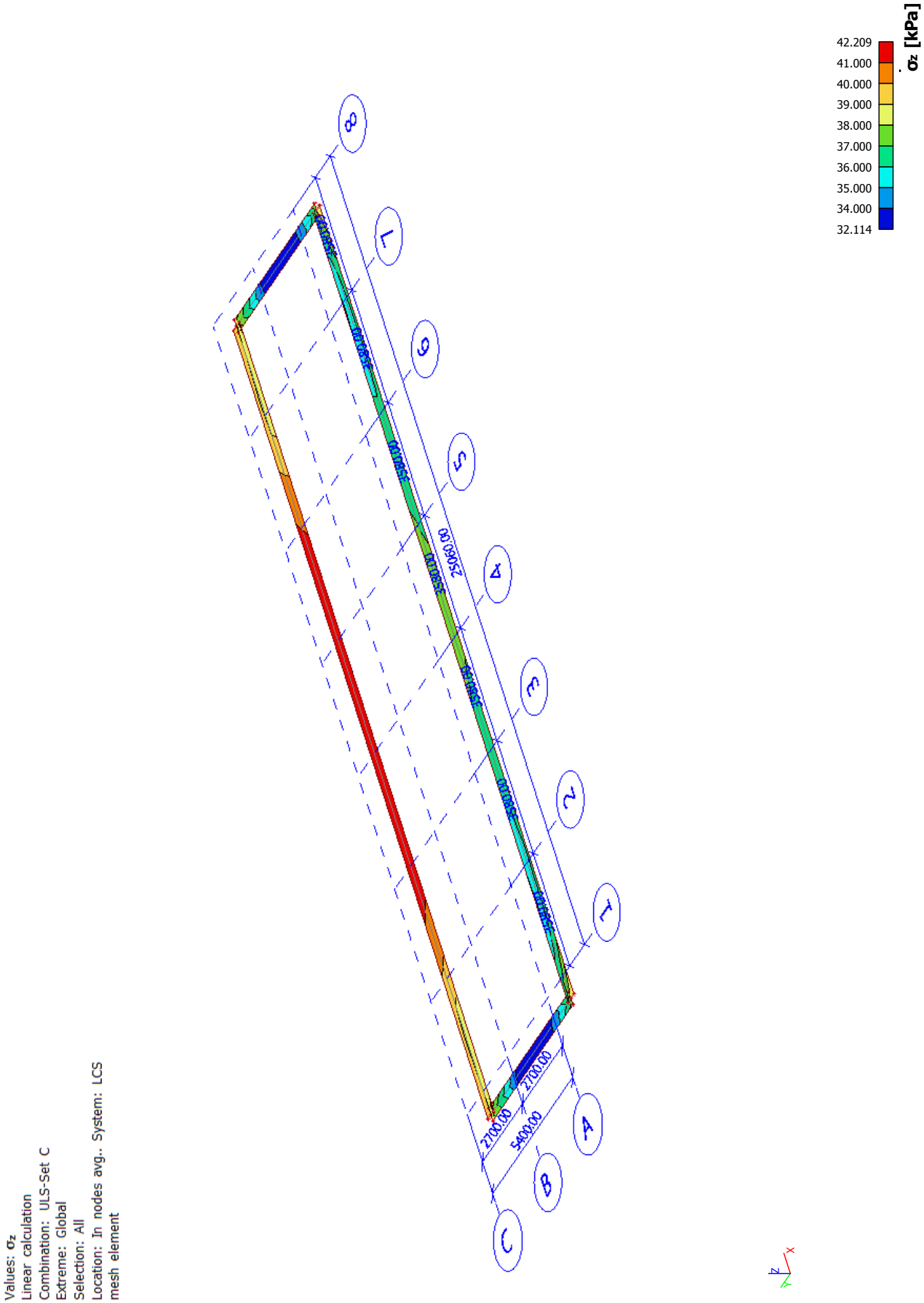
v_{Ed} - proračun posmične sile, $A_{sl,x/y}$ - vlačna uzdužna armatura, ρ_l - odgovarajući armaturni omjer, v_{Rdc} - otpornost na posmik bez posmične armatura, $v_{Rd,max}$ - maksimalna posmična otpornost betona, $A_{sw,req}$ - potrebna posmična armatura

8. Uticaji na temeljno tlo

8.1. Kontaktni naponi; σ_z; SET_B

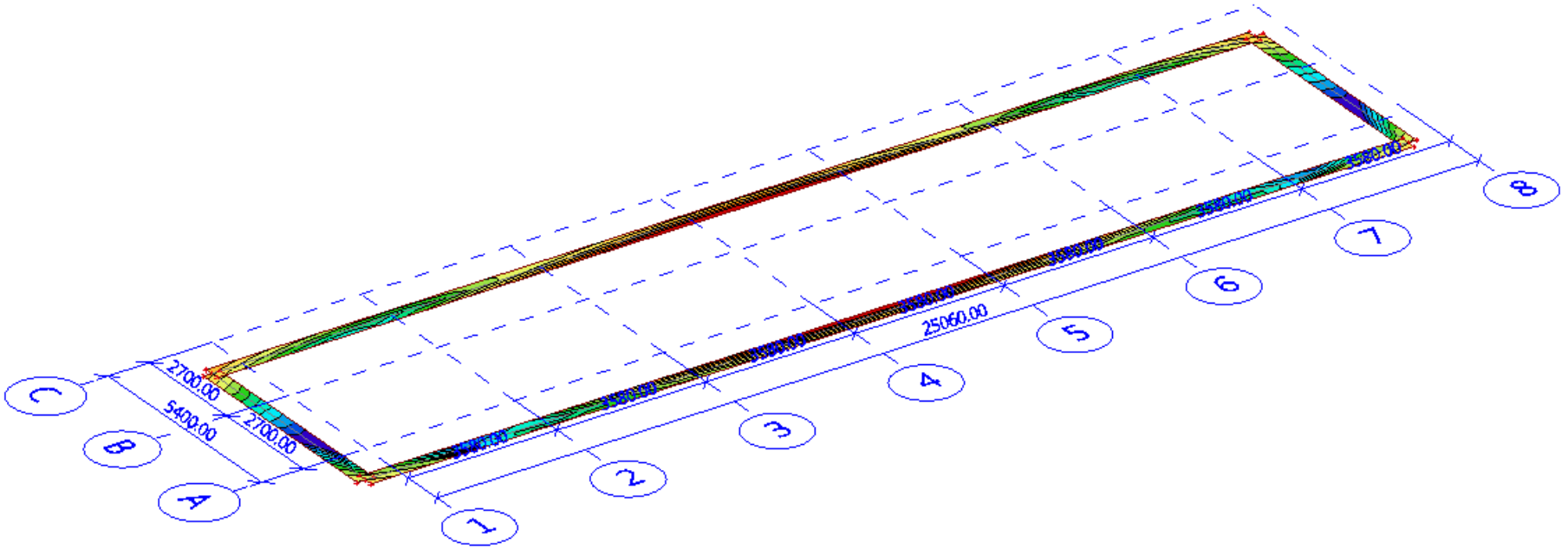


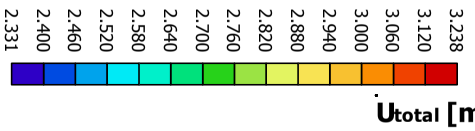
8.2. Kontaktni naponi; σ_z; SET_C



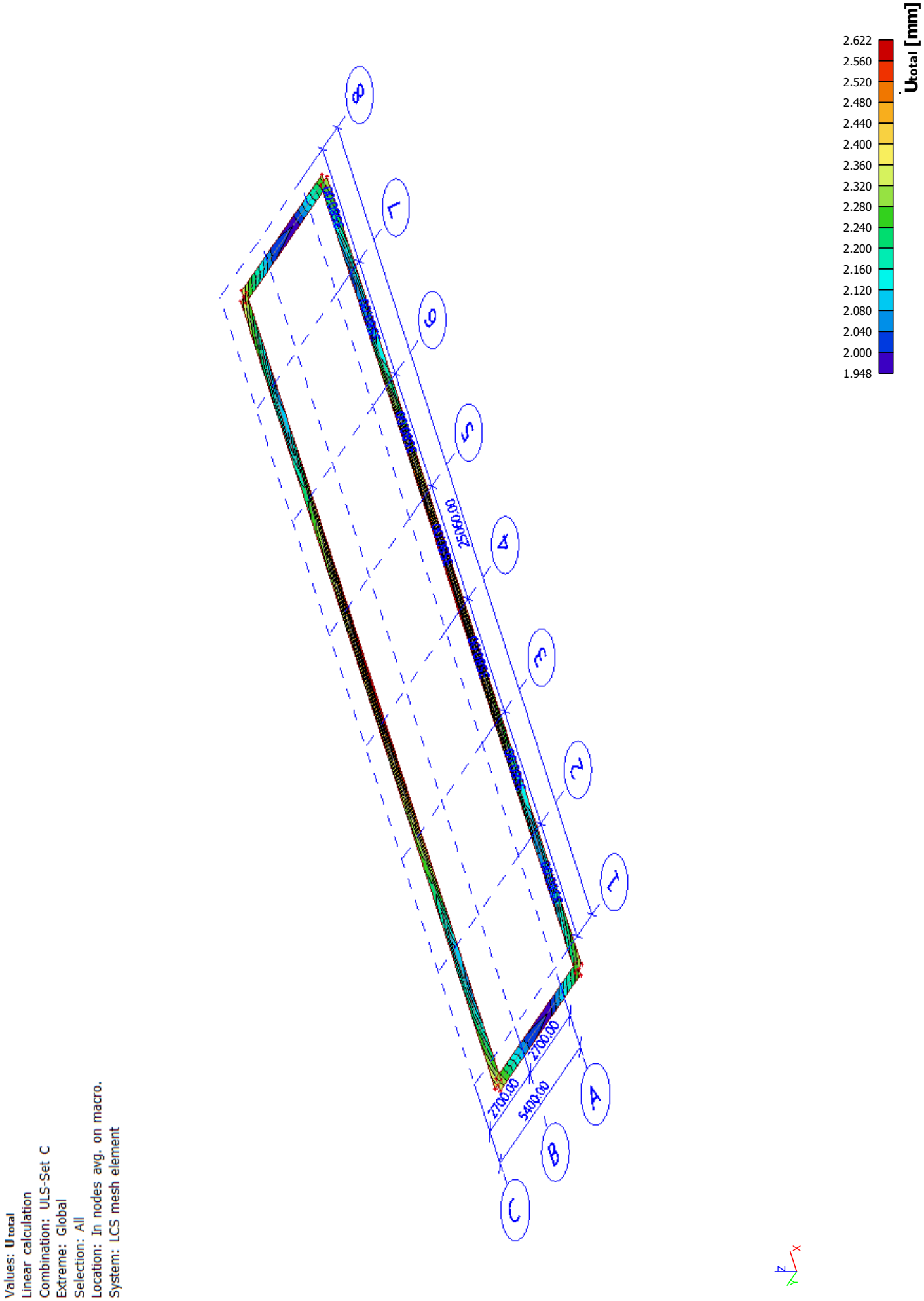
Values: **U total**
Linear calculation
Combination: ULS-Set B (auto)
Extreme: Global
Selection: All
Location: In nodes avg. on macro.
System: LCS mesh element

8.3. Sleganje temelja; U_total; SET_B





8.4. Sleganje temelja; U_total; SET_C



1. Reakcije

Linearni proračun
Klasa: All ULS
Sustav: Globalni
Ekstrem: Globalni
Odabir: Svi

Reakcije čvora

Naziv	Slučaj	R_x [kN]	R_y [kN]	R_z [kN]	M_x [kNm]	M_y [kNm]	M_z [kNm]	e_x [mm]	e_y [mm]
Sn7/N13	ULS-Set B (auto)/1	0.00	**-6.49**	11.73	8.36	0.00	0.00	713.122	0.184
Sn8/N15	ULS-Set B (auto)/2	0.00	**6.50**	8.62	-7.68	0.00	**0.00**	-890.662	0.114
Sn1/N3	Sx/3	-0.01	-0.01	**-0.01**	-0.02	-0.04	0.00	1644.399	3090.910
Sn4/N7	ULS-Set B (auto)/4	-0.06	-0.02	**45.40**	0.07	-0.04	0.00	1.471	-0.893
Sn7/N13	ULS-Set B (auto)/5	0.01	4.98	24.91	**-7.70**	0.02	0.00	-309.261	0.624
Sn8/N15	ULS-Set B (auto)/6	0.00	-5.38	22.24	**8.38**	0.00	0.00	376.971	0.058
Sn1/N3	ULS-Set B (auto)/5	**4.37**	3.96	26.59	-5.82	**3.66**	0.00	-218.890	137.782
Sn1/N3	ULS-Set B (auto)/7	**-4.41**	-2.28	16.13	3.17	**-4.55**	**0.00**	196.222	-282.279

Naziv	Kombinacijski ključ
ULS-Set B (auto)/1	g + g1 + 1.50*wD
ULS-Set B (auto)/2	g + g1 + 1.50*wL
Sx/3	- Sx + Accidental torsional moments for Sx
ULS-Set B (auto)/4	1.35*g + 1.35*g1 + 1.50*s
ULS-Set B (auto)/5	1.35*g + 1.35*g1 + 0.75*s + 1.50*wL
ULS-Set B (auto)/6	1.35*g + 1.35*g1 + 0.75*sD + 1.50*wD
ULS-Set B (auto)/7	g + g1 + 1.50*wK

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Design Specifications

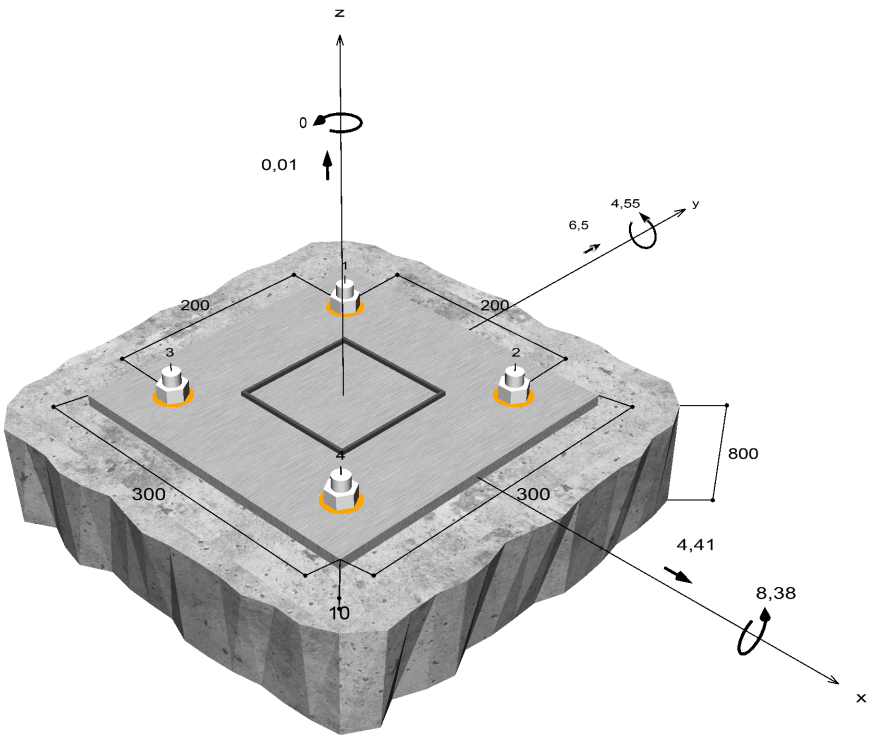
Anchor

Anchor system	fischer Injection system FIS EM plus
Injection resin	FIS EM Plus 390 S
Fixing element	Threaded rod FIS A M 16 x 250 8.8, zinc plated steel, Property Class 8.8
Calculated anchorage depth	200 mm
Design Data	Anchor design in Concrete according European Technical Assessment ETA-17/0979, Option 1, Issued 17/06/2020

Geometry / Loads / Scale units

mm, kN, kNm

Value of design actions (including partial safety factor for the load)



Not drawn to scale

The input values and the design results should be checked against local valid standards and approvals. Please respect the disclaimer of warranty in the license agreement of the Software.

Input data

Design method	ETAG 001, Technical Report TR 029
Base material	C20/25, EN 206
Concrete condition	Cracked, dry hole
Temperature range	24 °C long term temperature, 40 °C short term temperature
Reinforcement	No or standard reinforcement. No edge reinforcement. With reinforcement against splitting
Drilling method	Hammer drilling
Installation type	Push-through installation
Annular gap	Annular gap filled
Type of loading	Permanent-Transient/Static
Base plate location	Base plate flush installed on base material
Base plate geometry	300 mm x 300 mm x 10 mm
Profile type	Customized profile

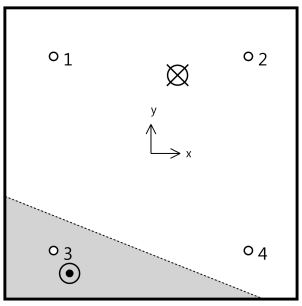
Design actions *)

#	N_{Sd} kN	$V_{Sd,x}$ kN	$V_{Sd,y}$ kN	$M_{Sd,x}$ kNm	$M_{Sd,y}$ kNm	$M_{T,Sd}$ kNm	Type of loading
1	0.01	4.41	6.50	8.38	-4.55	0.00	Permanent-Transient/Static

*) The required partial safety factors for actions are included

Resulting anchor forces

Anchor no.	Tensile action kN	Shear Action kN	Shear Action x kN	Shear Action y kN
1	14.92	1.96	1.10	1.63
2	22.16	1.96	1.10	1.63
3	0.00	1.96	1.10	1.63
4	3.97	1.96	1.10	1.63



max. concrete compressive strain :	0.29	‰
max. concrete compressive stress :	8.7	N/mm²
Resulting tensile actions :	41.05	kN , X/Y position (27 / 81)
Resulting compression actions :	41.04	kN , X/Y position (-84 / -124)

Resistance to tension loads

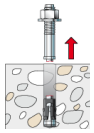
Proof	Action kN	Capacity kN	Utilisation β_N %
Steel failure *	22.16	84.00	26.4
Combined pull-out and concrete cone failure	41.05	90.23	**45.5**
Concrete cone failure	41.05	95.81	42.8

* Most unfavourable anchor

The input values and the design results should be checked against local valid standards and approvals. Please respect the disclaimer of warranty in the license agreement of the Software.

Steel failure

$$N_{Sd} \leq \frac{N_{Rk,s}}{\gamma_{Ms}} \quad (\ N_{Rd,s}\ )$$

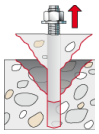


$N_{Rk,s}$ kN	γ_{Ms}	$N_{Rd,s}$ kN	N_{Sd} kN	$\beta_{N,s}$ %
126.00	1.50	84.00	22.16	26.4

Anchor no.	$\beta_{N,s}$ %	Group N°	Decisive Beta
1	17.8	1	$\beta_{N,s;1}$
2	26.4	2	$\beta_{N,s;2}$
3	0.0	3	$\beta_{N,s;3}$
4	4.7	4	$\beta_{N,s;4}$

Combined pull-out and concrete cone failure

$$N_{Sd} \leq \frac{N_{Rk,p}}{\gamma_{Mp}} \quad (\ N_{Rd,p}\ )$$



$$N_{Rk,p} = N^0_{Rk,p} \cdot \frac{A_{p,N}}{A^0_{p,N}} \cdot \Psi_{s,Np} \cdot \Psi_{g,Np} \cdot \Psi_{ec,Np} \cdot \Psi_{re,Np} \qquad \text{Eq. (5.2)}$$

$$N_{Rk,p} = 85.45kN \cdot \frac{425{,}124mm^2}{232{,}324mm^2} \cdot 1.000 \cdot 1.061 \cdot 0.816 \cdot 1.000 = 135.34kN$$

$$N^0_{Rk,p} = \pi \cdot d \cdot h_{ef} \cdot \tau_{Rk} = \pi \cdot 16mm \cdot 200mm \cdot 8.5N/mm^2 = 85.45kN \qquad \text{Eq. (5.2a)}$$

$$s_{cr,Np} = min\left(20 \cdot d \cdot \left(\frac{\tau_{Rk,ucr}}{7.5}\right)^{0.5};\ 3 \cdot h_{ef}\right) \qquad \text{Eq. (5.2c)}$$

$$s_{cr,Np} = min\left(20 \cdot 16mm \cdot \left(\frac{17.0N/mm^2}{7.5}\right)^{0.5};\ 3 \cdot 200mm\right) = 482mm$$

$$c_{cr,Np} = \frac{S_{cr,Np}}{2} = \frac{482mm}{2} = 241mm \qquad \text{Eq. (5.2d)}$$

$$\Psi_{s,Np} = min\left(1;\ 0.7 + 0.3 \cdot \frac{c}{c_{cr,Np}}\right) = min\left(1;\ 0.7 + 0.3 \cdot \frac{\infty}{241mm}\right) = 1.000 \leq 1 \qquad \text{Eq. (5.2e)}$$

$$\Psi_{g,Np} = \Psi^0_{g,Np} - \sqrt{\frac{s}{s_{cr,Np}}} \cdot \left(\Psi^0_{g,Np} - 1\right) = 1.172 - \sqrt{\frac{200mm}{482mm}} \cdot \left(1.172 - 1\right) = 1.061 \geq 1 \qquad \text{Eq. (5.2f)}$$

$$\Psi^0_{g,Np} = \sqrt{n} - \left(\sqrt{n} - 1\right) \cdot \left(\frac{d \cdot \tau_{Rk}}{k \cdot \sqrt{h_{ef} \cdot f_{ck,cube}}}\right)^{1.5} \qquad \text{Eq. (5.2g)}$$

$$\Psi^0_{g,Np} = \sqrt{3} - \left(\sqrt{3} - 1\right) \cdot \left(\frac{16mm \cdot 8.5N/mm^2}{2.3 \cdot \sqrt{200mm \cdot 25.0N/mm^2}}\right)^{1.5} = 1.172 \geq 1$$

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$$\Psi_{ec,Np} = \frac{1}{1+\frac{2e_n}{s_{cr,Np}}} = \Psi_{ec,Npx} \cdot \Psi_{ec,Npy} = 0.976 \cdot 0.836 = 0.816 \leq 1$$ Eq. (5.2h)

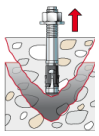
$$\Psi_{ec,Npx} = \frac{1}{1+\frac{2 \cdot 6mm}{482mm}} = 0.976 \leq 1 \qquad \Psi_{ec,Npy} = \frac{1}{1+\frac{2 \cdot 47mm}{482mm}} = 0.836 \leq 1$$

$$\Psi_{re,Np} = 1.000$$ Eq. (5.2i)

$N_{Rk,p}$ kN	γ_{Mp}	$N_{Rd,p}$ kN	N_{Sd} kN	$\beta_{N,p}$ %
135.34	1.50	90.23	41.05	45.5

Anchor no.	$\beta_{N,p}$ %	Group N°	Decisive Beta
1, 2, 4	45.5	1	$\beta_{N,p;1}$

Concrete cone failure



$$N_{Sd} \leq \frac{N_{Rk,c}}{\gamma_{Mc}}$$ ($N_{Rd,c}$)

$$N_{Rk,c} = N^0_{Rk,c} \cdot \frac{A_{c,N}}{A^0_{c,N}} \cdot \Psi_{s,N} \cdot \Psi_{re,N} \cdot \Psi_{ec,N}$$ Eq. (5.3)

$$N_{Rk,c} = 101.82kN \cdot \frac{600{,}000mm^2}{360{,}000mm^2} \cdot 1.000 \cdot 1.000 \cdot 0.847 = 143.71kN$$

$$N^0_{Rk,c} = k_1 \cdot \sqrt{f_{ck,cube}} \cdot h_{ef}^{1.5} = 7.2 \cdot \sqrt{25.0N/mm^2} \cdot \left(200mm\right)^{1.5} = 101.82kN$$ Eq. (5.3a)

$$\Psi_{s,N} = min\left(1;\ 0.7+0.3 \cdot \frac{c}{c_{cr,N}}\right) = min\left(1;\ 0.7+0.3 \cdot \frac{\infty}{300mm}\right) = 1.000 \leq 1$$ Eq. (5.3c)

$$\Psi_{re,N} = 1.000$$ Eq. (5.3d)

$$\Psi_{ec,N} = \frac{1}{1+\frac{2e_n}{s_{cr,N}}} \Rightarrow \Psi_{ec,Nx} \cdot \Psi_{ec,Ny} = 0.980 \cdot 0.864 = 0.847 \leq 1$$ Eq. (5.3e)

$$\Psi_{ec,Nx} = \frac{1}{1+\frac{2 \cdot 6mm}{600mm}} = 0.980 \leq 1 \qquad \Psi_{ec,Ny} = \frac{1}{1+\frac{2 \cdot 47mm}{600mm}} = 0.864 \leq 1$$

$N_{Rk,c}$ kN	γ_{Mc}	$N_{Rd,c}$ kN	N_{Sd} kN	$\beta_{N,c}$ %
143.71	1.50	95.81	41.05	42.8

Anchor no.	$\beta_{N,c}$ %	Group N°	Decisive Beta
1, 2, 4	42.8	1	$\beta_{N,c;1}$

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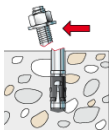
Resistance to shear loads

Proof	Action kN	Capacity kN	Utilisation βV %
Steel failure without lever arm *	1.96	50.40	**3.9**
Concrete pry-out failure	7.85	241.36	3.3

* Most unfavourable anchor

Steel failure without lever arm

$$V_{Sd} \leq \frac{V_{Rk,s}}{\gamma_{Ms}} \qquad (\mathbf{V_{Rd,s}})$$

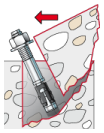


$V_{Rk,s}$ kN	γ_{Ms}	$V_{Rd,s}$ kN	V_{Sd} kN	β_{Vs} %
63.00	1.25	50.40	1.96	3.9

Anchor no.	β_{Vs} %	Group N°	Decisive Beta
1	3.9	1	$\beta_{Vs;1}$
2	3.9	2	$\beta_{Vs;2}$
3	3.9	3	$\beta_{Vs;3}$
4	3.9	4	$\beta_{Vs;4}$

Concrete pry-out failure

$$V_{Sd} \leq \frac{V_{Rk,cp}}{\gamma_{Mcp}} \qquad (\mathbf{V_{Rd,cp}})$$



$$V_{Rk,cp} = k \cdot N_{Rk,c} = 2 \cdot 181.02kN = 362.04kN \qquad \text{Eq. (5.7a)}$$

$$N_{Rk,c} = N^0_{Rk,c} \cdot \frac{A_{c,N}}{A^0_{c,N}} \cdot \Psi_{s,N} \cdot \Psi_{re,N} \cdot \Psi_{ec,N} \qquad \text{Eq. (5.3)}$$

$$N_{Rk,c} = 101.82kN \cdot \frac{640{,}000mm^2}{360{,}000mm^2} \cdot 1.000 \cdot 1.000 \cdot 1.000 = 181.02kN$$

$$N^0_{Rk,c} = k_1 \cdot \sqrt{f_{ck,cube}} \cdot h_{ef}^{1.5} = 7.2 \cdot \sqrt{25.0N/mm^2} \cdot \left(200mm\right)^{1.5} = 101.82kN \qquad \text{Eq. (5.3a)}$$

$$\Psi_{s,N} = min\left(1;\ 0.7 + 0.3 \cdot \frac{c}{c_{cr,N}}\right) = min\left(1;\ 0.7 + 0.3 \cdot \frac{\infty}{300mm}\right) = 1.000 \leq 1 \qquad \text{Eq. (5.3c)}$$

$$\Psi_{re,N} = 1.000 \qquad \text{Eq. (5.3d)}$$

$$\Psi_{ec,N} = \frac{1}{1 + \frac{2e_n}{s_{cr,N}}} \Rightarrow \Psi_{ec,Nx} \cdot \Psi_{ec,Ny} = 1.000 \cdot 1.000 = 1.000 \leq 1 \qquad \text{Eq. (5.3e)}$$

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$V_{Rk,cp}$ kN	γ_{Mcp}	$V_{Rd,cp}$ kN	V_{Sd} kN	$\beta_{V,cp}$ %
362.04	1.50	241.36	7.85	3.3

Anchor no.	$\beta_{V,cp}$ %	Group N°	Decisive Beta
1, 2, 3, 4	3.3	1	$\beta_{V,cp;1}$

Utilization of tension and shear loads

Tension loads	Utilisation β_N %
Steel failure *	26.4
Combined pull-out and concrete cone failure	**45.5**
Concrete cone failure	42.8

Shear Loads	Utilisation β_V %
Steel failure without lever arm *	**3.9**
Concrete pry-out failure	3.3

* Most unfavourable anchor

Resistance to combined tensile and shear loads

$$\beta_N = \beta_{N,p;1} = 0.45 \leq 1 \quad \text{Eq. (5.9a)}$$
$$\beta_V = \beta_{Vs;1} = 0.04 \leq 1 \quad \text{Eq. (5.9b)}$$
$$\beta_N^{1.5} + \beta_V^{1.5} = \beta_{N,p;1}^{1.5} + \beta_{Vs;1}^{1.5} = 0.31 \leq 1 \quad \text{Eq. (5.10)}$$

Proof successful

Information concerning the anchor plate

Base plate details

Plate thickness specified by user without proof t = 10 mm

Profile type Customized profile

Technical remarks

All data and information in the software is based on fischer products and common engineering knowledge. Please check all the proof results against local valid standards and approvals.
As fischer is not the design office, the attached is no guarantee for incorrect input or assumptions. Any recommendations have to be approved by the building-authority or project engineer. Results are valid only for anchor system calculated in the attached. If any part of the system is changed, it will invalidate this report and new calculations would be required. The calculation was done under the assumption that a sufficient splitting reinforcement is available. In this case the spliiting failure can be omitted.
The transmission of the anchor loads to the supports of the concrete member shall be shown for the ultimate limit state and the serviceability limit state; for this purpose, the normal verifications shall be carried out under due consideration of the actions introduced by the anchors. For these verifications the additional provisions given in the current design method shall be taken into account.
As a pre-condition the anchor plate is assumed to be flat when subjected to the actions. Therefore, the plate (if present) must be sufficiently stiff. The C-Fix anchor plate design is based on a proof of stresses and does not allow a statement about the stiffness of the plate. The proof of the necessary stiffness is not carried out by C-Fix.

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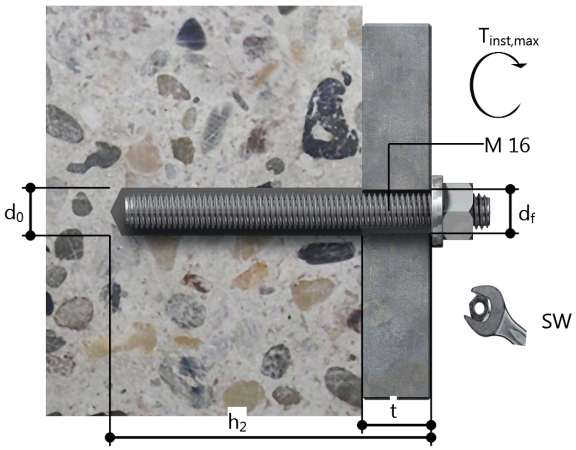
Installation data

Anchor

Anchor system	**fischer Injection system FIS EM plus**	
Injection resin	FIS EM Plus 390 S (other cartridge sizes available)	Art.-No. 544155
Fixing element	Threaded rod FIS A M 16 x 250 8.8, zinc plated steel, Property Class 8.8	Art.-No. 517940
Accessories	FIS MR Plus	Art.-No. 545853
	FIS Extension tube 9mm	Art.-No. 48983
	Dispenser FIS DM S	Art.-No. 511118
	Compressed-air cleaning tool	Art.-No. 93286
	compressed air (oil-free), min. 6 bar	By job site.
	BSD 18	Art.-No. 1493
	SDS Chuck with internal thread M8	Art.-No. 530332
	SDS Plus-V II 18/250/300	Art.-No. 531837
	or alternatively	
	FHD 18/320/450	Art.-No. 546600
	Hammer drilling with or without suction	
Alternative cartdriges	FIS EM Plus 585 S	Art.-No. 544165
	FIS EM Plus 1500 S	Art.-No. 544173
	The shown cartdriges are alternative to the highlighted one above with the same approval number.	

Installation details

Thread diameter	M 16
Drill hole diameter	d_0 = 18 mm
Drill hole depth	h_2 = 210 mm
Calculated anchorage depth	h_{ef} = 200 mm
Drilling method	Hammer drilling
Drill hole cleaning	2 times blowing (compressed air), 2 times brushing, 2 times blowing (compressed air) No borehole cleaning required in case of using a hollow drill bit, e.g. fischer FHD.
Installation type	Push-through installation
Annular gap	Annular gap filled
Maximum torque	$T_{inst,max}$ = 60.0 Nm
Socket size	24 mm
Base plate thickness	t = 10 mm
Total fixing thickness Tfix,max	t_{fix} = 10 mm
Volume of resin per drill hole	24 ml/12 scale divisions



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Base plate details

Base plate material	S 235 (St 37)
Base plate thickness	t = 10 mm
Clearance hole in base plate	d_f=20 mm

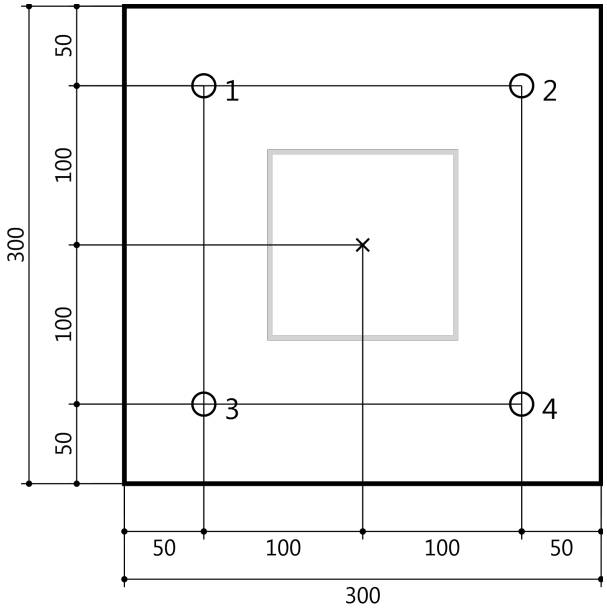
Attachment

Profile type: Customized profile

Profile dimensions	mm
Flange thickness	3

Anchor coordinates

Anchor no.	x mm	y mm
1	-100	100
2	100	100
3	-100	-100
4	100	-100



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Project:	**Veza stuba i rešetke**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

Material

Steel	S 235
Concrete	C25/30

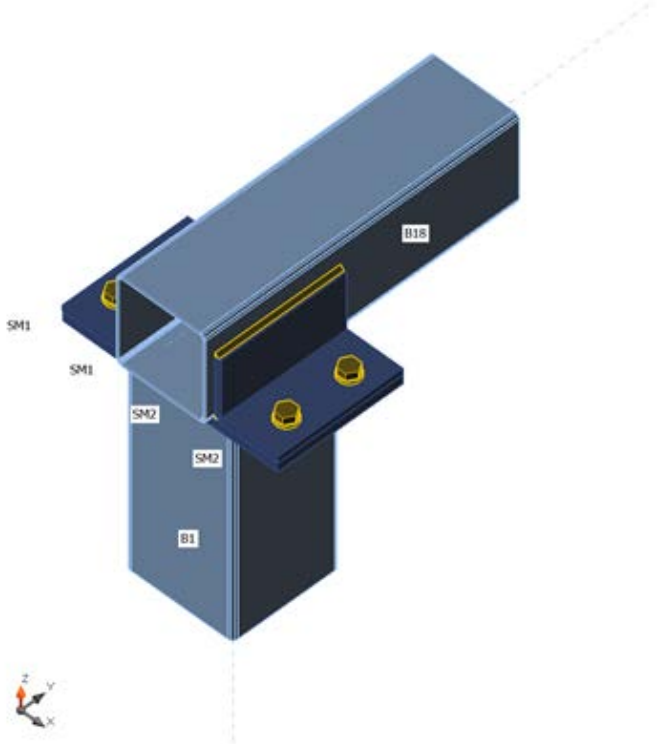
Project item Con N2

Design

Name	Con N2
Description	
Analysis	Stress, strain/ loads in equilibrium

Beams and columns

Name	Cross-section	β – Direction [°]	γ - Pitch [°]	α - Rotation [°]	Offset ex [mm]	Offset ey [mm]	Offset ez [mm]	Forces in
B1	1 - CFRHS120X120X3(RHS120x120)	0.0	90.0	0.0	60	0	0	Position
B18	2 - CFRHS100X100X3(RHS100x100)	90.0	0.0	0.0	-80	0	0	Position



Project:	**Veza stuba i rešetke**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

Cross-sections

Name	Material
1 - CFRHS120X120X3(RHS120x120)	S 235
2 - CFRHS100X100X3(RHS100x100)	S 235
4 - L70X7	S 235

Bolts

Name	Bolt assembly	Diameter [mm]	fu [MPa]	Gross area [mm^2]
M12 8.8	M12 8.8	12	800.0	113

Project:	**Veza stuba i rešetke**
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Load effects (forces in equilibrium)

Name	Member	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
ULS-Set(1)	B1	1.6	-1.1	-0.8	0.0	0.4	0.0
	B18	0.1	-3.5	0.1	0.2	-0.1	-2.1
ULS-Set(2)	B1	-6.3	0.0	0.0	0.0	0.0	0.0
	B18	11.1	0.0	-1.5	0.0	0.8	0.0
ULS-Set(3)	B1	-1.8	2.1	0.2	0.0	-0.4	0.0
	B18	2.2	3.4	-0.6	-0.3	0.3	2.1
ULS-Set(4)	B1	1.4	-2.3	0.3	0.0	-0.5	0.0
	B18	0.2	3.8	0.2	-0.2	-0.1	2.1
ULS-Set(5)	B1	-1.3	-2.3	0.3	0.0	-0.5	0.0
	B18	4.9	3.8	-0.4	-0.2	0.2	2.1
ULS-Set(6)	B1	-1.9	0.0	0.0	0.0	0.0	0.0
	B18	3.5	0.0	-0.5	0.0	0.2	0.0
ULS-Set(7)	B1	-2.8	2.1	0.2	0.0	-0.4	0.0
	B18	3.8	3.4	-0.8	-0.3	0.4	2.1
ULS-Seis(8)	B1	-1.4	0.0	0.0	0.0	0.0	0.0
	B18	2.6	0.0	-0.4	0.0	0.2	0.0
ULS-Set(9)	B1	-1.2	-1.1	-0.8	0.0	0.4	0.0
	B18	4.8	-3.5	-0.5	0.2	0.2	-2.1
ULS-Set(10)	B1	-5.6	1.3	0.2	0.0	-0.2	0.0
	B18	9.0	2.1	-1.4	-0.2	0.7	1.3
ULS-Set(11)	B1	-0.1	2.1	0.2	0.0	-0.4	0.0
	B18	-0.9	3.4	-0.2	-0.3	0.1	2.1
ULS-Set(12)	B1	-1.2	-2.3	0.3	0.0	-0.5	0.0
	B18	4.6	3.8	-0.4	-0.2	0.2	2.1
ULS-Set(13)	B1	-2.7	2.1	0.2	0.0	-0.4	0.0
	B18	3.5	3.4	-0.8	-0.3	0.4	2.1
ULS-Set(14)	B1	0.2	-2.3	0.3	0.0	-0.5	0.0
	B18	2.4	3.8	-0.1	-0.2	0.0	2.1
ULS-Set(15)	B1	-2.7	-1.4	0.2	0.0	-0.3	0.0
	B18	6.4	2.3	-0.8	-0.1	0.3	1.3
ULS-Set(16)	B1	-4.4	0.0	0.0	0.0	0.0	0.0
	B18	7.9	0.0	-1.1	0.0	0.5	0.0
Sx(17)	B1	0.0	0.0	0.0	0.0	0.0	0.0
	B18	0.0	0.0	0.0	0.0	0.0	0.0
ULS-Set(18)	B1	1.1	-1.1	-0.8	0.0	0.4	0.0
	B18	1.0	-3.5	0.0	0.2	0.0	-2.1
Sy(19)	B1	0.0	0.0	0.0	0.0	0.0	0.0
	B18	0.0	0.0	0.0	0.0	0.0	0.0
ULS-Set(20)	B1	-3.9	0.0	0.0	0.0	0.0	0.0
	B18	7.0	0.0	-1.0	0.0	0.5	0.0
ULS-Set(21)	B1	-1.0	-1.1	-0.8	0.0	0.4	0.0
	B18	4.5	-3.5	-0.5	0.2	0.2	-2.1

Project: Veza stuba i rešetke
Project no: 51 - IDP/2022
Author: Imre Kekenj, mast.inž.građ.

Name	Member	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
ULS-Set(22)	B1	-0.5	-1.1	-0.8	0.0	0.4	0.0
	B18	3.6	-3.5	-0.4	0.2	0.2	-2.1
Sy(23)	B1	0.0	0.0	0.0	0.0	0.0	0.0
	B18	0.0	0.0	0.0	0.0	0.0	0.0
ULS-Set(24)	B1	-0.6	2.1	0.2	0.0	-0.4	0.0
	B18	0.0	3.4	-0.3	-0.3	0.1	2.1
ULS-Set(25)	B1	-5.9	0.0	0.0	0.0	0.0	0.0
	B18	10.2	0.0	-1.4	0.0	0.7	0.0
ULS-Set(26)	B1	-2.2	2.1	0.2	0.0	-0.4	0.0
	B18	2.6	3.4	-0.6	-0.3	0.3	2.1
Sy(27)	B1	0.0	0.0	0.0	0.0	0.0	0.0
	B18	0.0	0.0	0.0	0.0	0.0	0.0
ULS-Set(28)	B1	-4.6	-1.4	0.2	0.0	-0.3	0.0
	B18	9.6	2.3	-1.2	-0.1	0.6	1.3
ULS-Set(29)	B1	-5.3	1.3	0.2	0.0	-0.2	0.0
	B18	8.4	2.1	-1.3	-0.2	0.7	1.3
Sx(30)	B1	0.0	0.0	0.0	0.0	0.0	0.0
	B18	0.0	0.0	0.0	0.0	0.0	0.0
ULS-Set(31)	B1	-0.3	-2.3	0.3	0.0	-0.5	0.0
	B18	3.3	3.8	-0.2	-0.2	0.1	2.1
ULS-Set(32)	B1	0.9	-2.3	0.3	0.0	-0.5	0.0
	B18	1.1	3.8	0.1	-0.2	-0.1	2.1
ULS-Set(33)	B1	-4.6	-0.7	-0.5	0.0	0.2	0.0
	B18	9.6	-2.1	-1.2	0.1	0.6	-1.3
ULS-Set(34)	B1	-0.7	-1.1	-0.8	0.0	0.4	0.0
	B18	3.9	-3.5	-0.4	0.2	0.2	-2.1
ULS-Set(35)	B1	-1.3	2.1	0.2	0.0	-0.4	0.0
	B18	1.3	3.4	-0.5	-0.3	0.2	2.1
ULS-Set(36)	B1	0.3	-1.1	-0.8	0.0	0.4	0.0
	B18	2.3	-3.5	-0.2	0.2	0.1	-2.1
ULS-Set(37)	B1	-0.2	-1.1	-0.8	0.0	0.4	0.0
	B18	3.2	-3.5	-0.3	0.2	0.1	-2.1
ULS-Set(38)	B1	-2.3	2.1	0.2	0.0	-0.4	0.0
	B18	2.9	3.4	-0.7	-0.3	0.3	2.1
ULS-Set(39)	B1	-0.8	-2.3	0.3	0.0	-0.5	0.0
	B18	4.0	3.8	-0.3	-0.2	0.1	2.1

Project:	**Veza stuba i rešetke**
Project no:	**51 - IDP/2022**
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Check

Summary

Name	Value	Status
Analysis	100.0%	OK
Plates	0.0 < 5%	OK
Bolts	31.8 < 100%	OK
Welds	73.9 < 100%	OK
Buckling	Not calculated	
GMNA	Calculated	

Plates

Name	Thickness [mm]	Loads	σ_{Ed} [MPa]	ε_{Pl} [%]	Status
B1	3.0	ULS-Set(2)	144.0	0.0	OK
B18	3.0	ULS-Set(7)	212.5	0.0	OK
SM1-bfl 1	7.0	ULS-Set(33)	217.5	0.0	OK
SM1-w 1	7.0	ULS-Set(2)	123.0	0.0	OK
SM2-bfl 1	7.0	ULS-Set(10)	221.7	0.0	OK
SM2-w 1	7.0	ULS-Set(2)	123.0	0.0	OK
SP1	10.0	ULS-Set(10)	125.2	0.0	OK

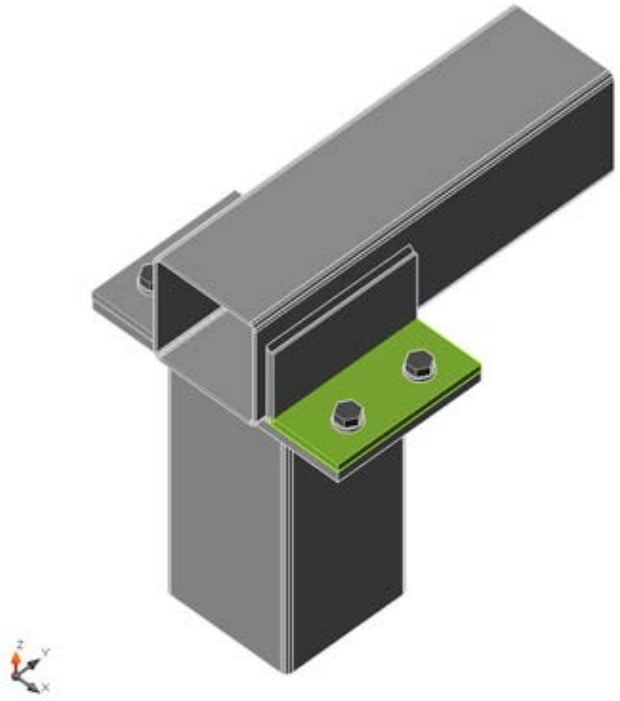
Design data

Material	f_y [MPa]	ε_{lim} [%]
S 235	235.0	5.0

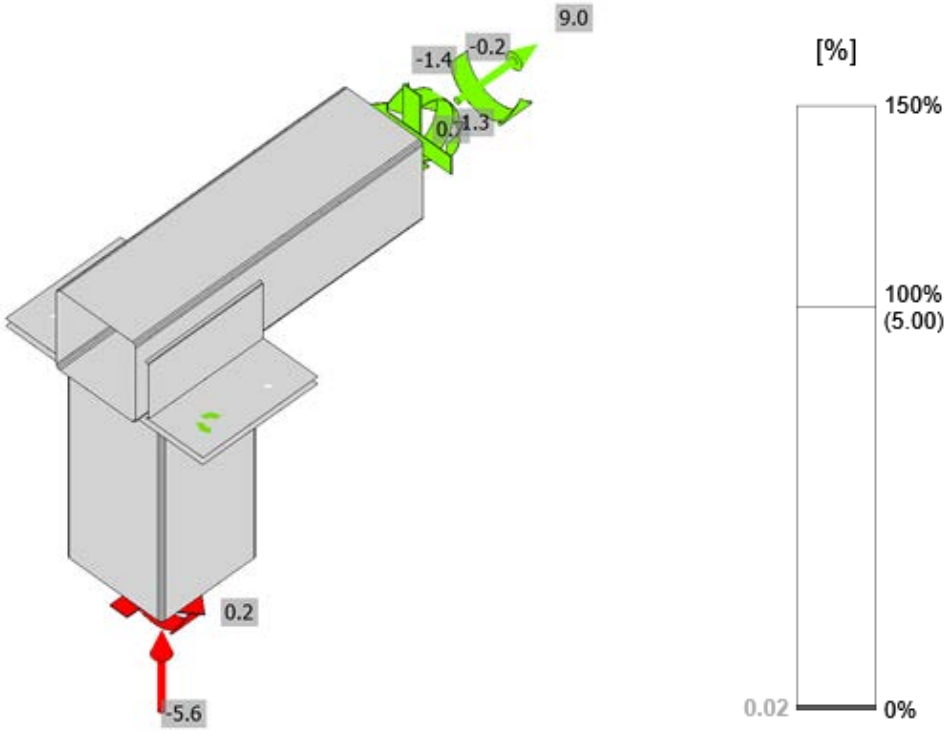
Symbol explanation

ε_{Pl}	Strain
σ_{Ed}	Eq. stress
f_y	Yield strength
ε_{lim}	Limit of plastic strain

Project:	**Veza stuba i rešetke**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

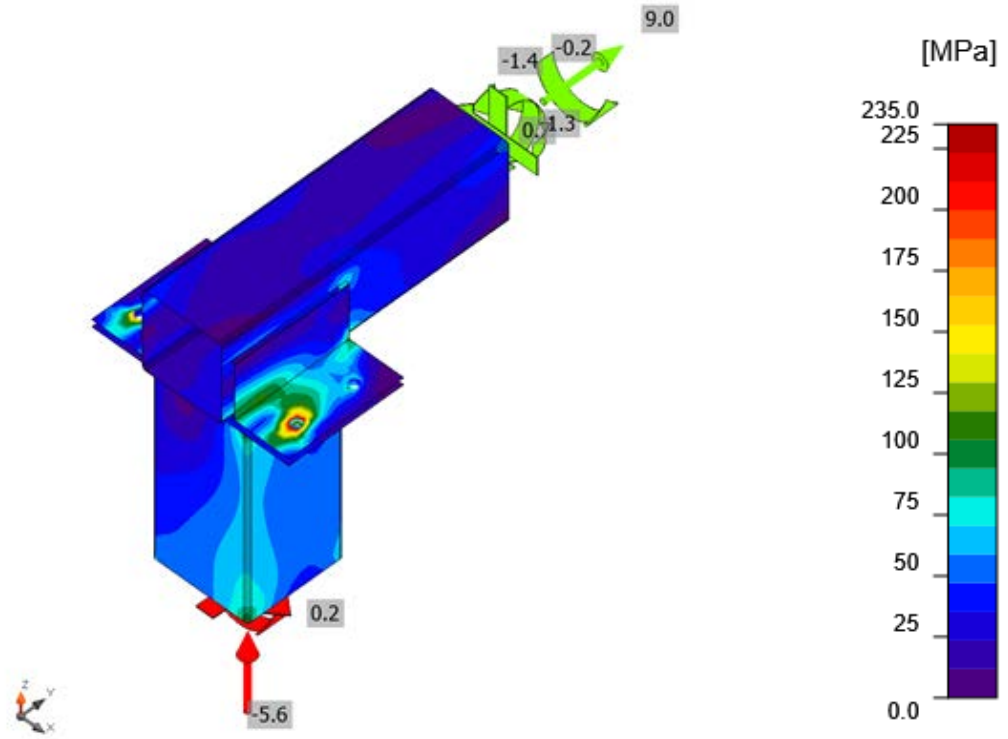


Overall check, ULS-Set(10)



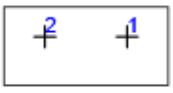
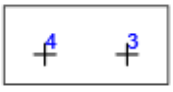
Strain check, ULS-Set(10)

Project:	**Veza stuba i rešetke**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**



Equivalent stress, ULS-Set(10)

Bolts

	Name	Loads	$F_{t,Ed}$ [kN]	V [kN]	Ut_t [%]	$F_{b,Rd}$ [kN]	Ut_s [%]	Ut_{ts} [%]	Status
	B1	ULS-Set(9)	2.1	5.9	4.4	60.5	18.4	21.5	OK
	B2	ULS-Set(33)	10.9	4.9	22.6	54.3	15.3	31.4	OK
	B3	ULS-Set(5)	2.1	6.0	4.4	60.5	18.5	21.7	OK
	B4	ULS-Set(10)	11.4	4.8	23.7	54.3	14.9	31.8	OK

Design data

Name	$F_{t,Rd}$ [kN]	$B_{p,Rd}$ [kN]	$F_{v,Rd}$ [kN]
M12 8.8 - 1	48.4	76.0	32.3

Project:	**Veza stuba i rešetke**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

Symbol explanation

$F_{t,Rd}$	Bolt tension resistance EN 1993-1-8 tab. 3.4
$F_{t,Ed}$	Tension force
$B_{p,Rd}$	Punching shear resistance
V	Resultant of shear forces Vy, Vz in bolt
$F_{v,Rd}$	Bolt shear resistance EN_1993-1-8 table 3.4
$F_{b,Rd}$	Plate bearing resistance EN 1993-1-8 tab. 3.4
Ut_t	Utilization in tension
Ut_s	Utilization in shear
Ut_{ts}	Utilization in tension and shear EN 1993-1-8 table 3.4

Welds (Plastic redistribution)

Item	Edge	Throat th. [mm]	Length [mm]	Loads	$\sigma_{w,Ed}$ [MPa]	ε_{Pl} [%]	σ_U [MPa]	$\tau_{\parallel}$ [MPa]	τ_U [MPa]	Ut [%]	Ut_c [%]	Status
B18-w 2	SM1-w 1	◢3.0	140	ULS-Set(9)	99.2	0.0	49.6	-39.6	29.8	27.5	7.4	OK
B18-w 2	SM1-w 1	◢3.0	140	ULS-Set(7)	262.3	0.0	-49.8	-131.1	70.2	72.9	13.0	OK
B18-w 4	SM2-w 1	◢3.0	140	ULS-Set(7)	101.7	0.0	50.2	-41.3	-30.1	28.3	7.8	OK
B18-w 4	SM2-w 1	◢3.0	140	ULS-Set(5)	265.9	0.0	88.3	125.4	72.4	73.9	15.1	OK
SP1	B1	◢3.0	460	ULS-Set(2)	234.1	0.0	-139.6	33.0	103.3	65.0	14.3	OK

Design data

	β_w [-]	$\sigma_{w,Rd}$ [MPa]	0.9 σ [MPa]
S 235	0.80	360.0	259.2

Symbol explanation

ε_{Pl}	Strain
$\sigma_{w,Ed}$	Equivalent stress
$\sigma_{w,Rd}$	Equivalent stress resistance
$\sigma_{\perp}$	Perpendicular stress
$\tau_{\parallel}$	Shear stress parallel to weld axis
$\tau_{\perp}$	Shear stress perpendicular to weld axis
0.9 σ	Perpendicular stress resistance - 0.9*fu/γM2
β_w	Corelation factor EN 1993-1-8 tab. 4.1
Ut	Utilization
Utc	Weld capacity utilization

Buckling

Buckling analysis was not calculated.

Project:	**Veza rožnjače i krovnog nosača**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

Material

Steel	S 235
Concrete	C25/30

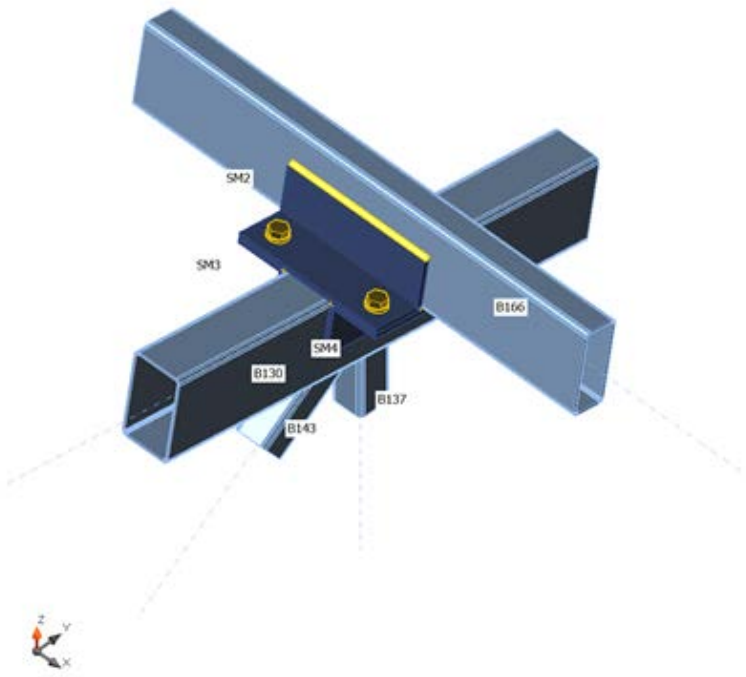
Project item Con N145

Design

Name	Con N145
Description	
Analysis	Stress, strain/ loads in equilibrium

Beams and columns

Name	Cross-section	β – Direction [°]	γ - Pitch [°]	α - Rotation [°]	Offset ex [mm]	Offset ey [mm]	Offset ez [mm]	Forces in
B130	3 - CFRHS100X60X3(RHS100x60)	90.0	10.0	0.0	0	0	0	Position
B137	1 - CFRHS40X40X3(RHS40x40)	0.0	90.0	90.0	0	0	0	Position
B143	1 - CFRHS40X40X3(RHS40x40)	-90.0	36.3	0.0	0	0	0	Position
B166	2 - CFRHS100X40X3(RHS100x40)	180.0	0.0	10.0	0	0	100	Position



Project:	**Veza rožnjače i krovnog nosača**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

Cross-sections

Name	Material
3 - CFRHS100X60X3(RHS100x60)	S 235
1 - CFRHS40X40X3(RHS40x40)	S 235
2 - CFRHS100X40X3(RHS100x40)	S 235
4 - L60X6	S 235

Bolts

Name	Bolt assembly	Diameter [mm]	fu [MPa]	Gross area [mm^2]
M12 8.8	M12 8.8	12	800.0	113

Project:	**Veza rožnjače i krovnog nosača**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

Load effects (forces in equilibrium)

Name	Member	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
ULS-Set(1)	B130	-5.3	-0.5	0.4	0.0	-0.3	-0.4
	B137	5.3	0.0	0.0	0.0	0.0	0.0
	B143	-2.5	0.0	0.0	0.0	0.0	0.0
	B166	-0.3	0.9	1.4	0.0	0.9	-0.3
	B166	0.6	1.7	1.2	0.0	-0.8	1.0
	B130	0.0	0.0	0.0	0.0	0.0	0.0
ULS-Set(2)	B130	10.4	0.1	-0.9	-0.2	0.6	0.1
	B137	-21.9	0.0	0.0	0.0	0.0	0.0
	B143	13.9	0.0	0.0	0.0	0.0	0.0
	B166	-0.5	-0.4	-5.1	0.0	-3.3	0.2
	B166	0.4	-0.7	-4.3	0.0	3.0	-0.4
	B130	0.0	0.0	0.0	0.0	0.0	0.0
ULS-Set(4)	B130	10.4	0.1	-0.9	-0.2	0.6	0.1
	B137	-19.7	0.0	0.0	0.0	0.0	0.0
	B143	10.9	0.0	0.0	0.0	0.0	0.0
	B166	-0.3	-0.4	-5.1	0.0	-3.3	0.2
	B166	0.3	-0.7	-4.3	0.0	3.0	-0.4
	B130	0.0	0.0	0.0	0.0	0.0	0.0
ULS-Set(5)	B130	1.2	0.5	-0.2	0.0	0.1	0.4
	B137	-4.2	0.0	0.0	0.0	0.0	0.0
	B143	3.7	0.0	0.0	0.0	0.0	0.0
	B166	-0.8	-0.8	-0.6	0.0	-0.4	0.3
	B166	0.5	-1.6	-0.5	0.0	0.4	-0.9
	B130	0.0	0.0	0.0	0.0	0.0	0.0
ULS-Set(20)	B130	1.2	0.5	-0.2	0.0	0.1	0.4
	B137	-5.3	0.0	0.0	0.0	0.0	0.0
	B143	5.2	0.0	0.0	0.0	0.0	0.0
	B166	-0.9	-0.8	-0.6	0.0	-0.4	0.3
	B166	0.6	-1.6	-0.5	0.0	0.4	-0.9
	B130	0.0	0.0	0.0	0.0	0.0	0.0
ULS-Set(28)	B130	2.2	-0.3	-0.2	-0.1	0.2	-0.2
	B137	-10.3	0.0	0.0	0.0	0.0	0.0
	B143	8.6	0.0	0.0	0.0	0.0	0.0
	B166	-0.6	0.3	-1.8	0.0	-1.2	-0.1
	B166	0.8	0.7	-1.5	0.0	1.1	0.4
	B130	0.0	0.0	0.0	0.0	0.0	0.0

Project:	**Veza rožnjače i krovnog nosača**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

Check

Summary

Name	Value	Status
Analysis	100.0%	OK
Plates	0.3 < 5%	OK
Bolts	12.4 < 100%	OK
Welds	98.1 < 100%	OK
Buckling	Not calculated	
GMNA	Calculated	

Plates

Name	Thickness [mm]	Loads	σ_{Ed} [MPa]	ε_{Pl} [%]	Status
B130	3.0	ULS-Set(2)	235.6	0.3	OK
B137	3.0	ULS-Set(2)	223.1	0.1	OK
B143	3.0	ULS-Set(2)	186.1	0.0	OK
B166	3.0	ULS-Set(4)	235.1	0.0	OK
SM1-bfl 1	6.0	ULS-Set(1)	81.4	0.0	OK
SM1-w 1	6.0	ULS-Set(1)	63.9	0.0	OK
SM2-bfl 1	6.0	ULS-Set(4)	66.5	0.0	OK
SM2-w 1	6.0	ULS-Set(4)	46.3	0.0	OK
SM3-tfl 1	6.0	ULS-Set(1)	66.9	0.0	OK
SM3-w 1	6.0	ULS-Set(1)	43.5	0.0	OK
SM4-tfl 1	6.0	ULS-Set(1)	77.0	0.0	OK
SM4-w 1	6.0	ULS-Set(2)	91.1	0.0	OK

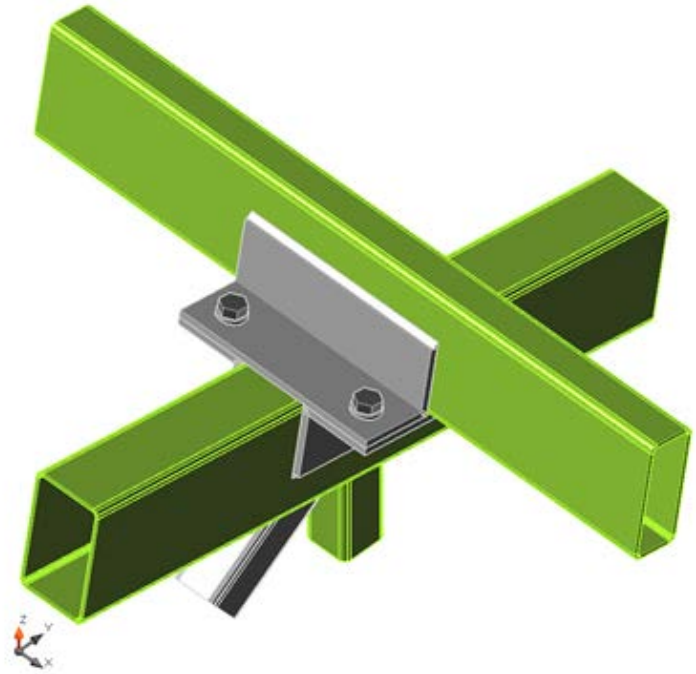
Design data

Material	f_y [MPa]	ε_{lim} [%]
S 235	235.0	5.0

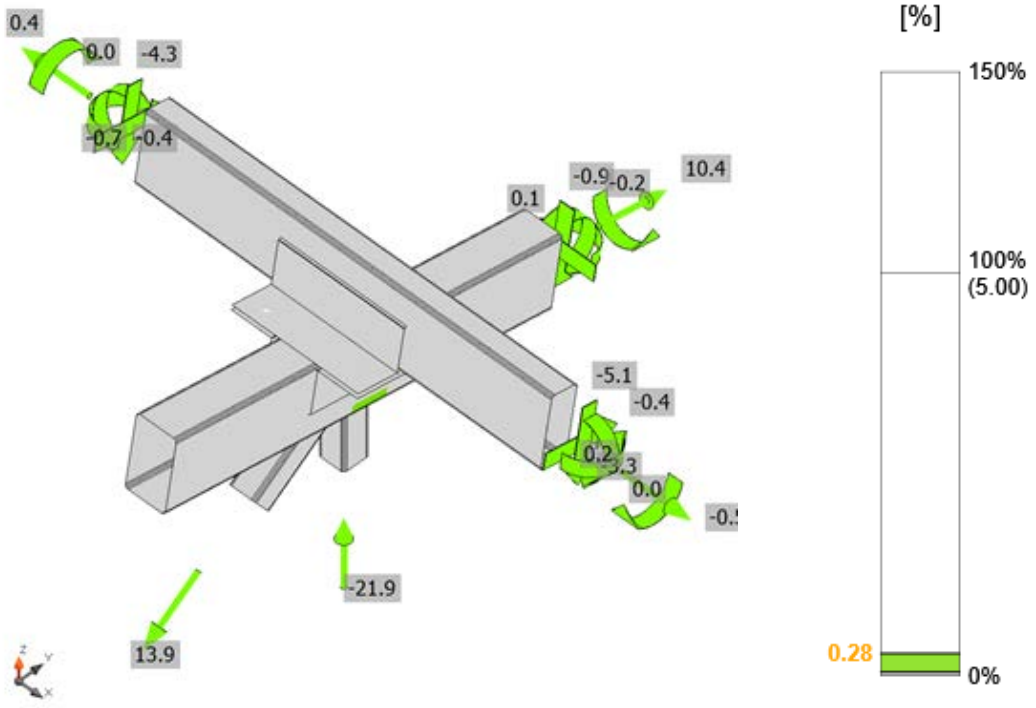
Symbol explanation

ε_{Pl}	Strain
σ_{Ed}	Eq. stress
f_y	Yield strength
ε_{lim}	Limit of plastic strain

Project:	**Veza rožnjače i krovnog nosača**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

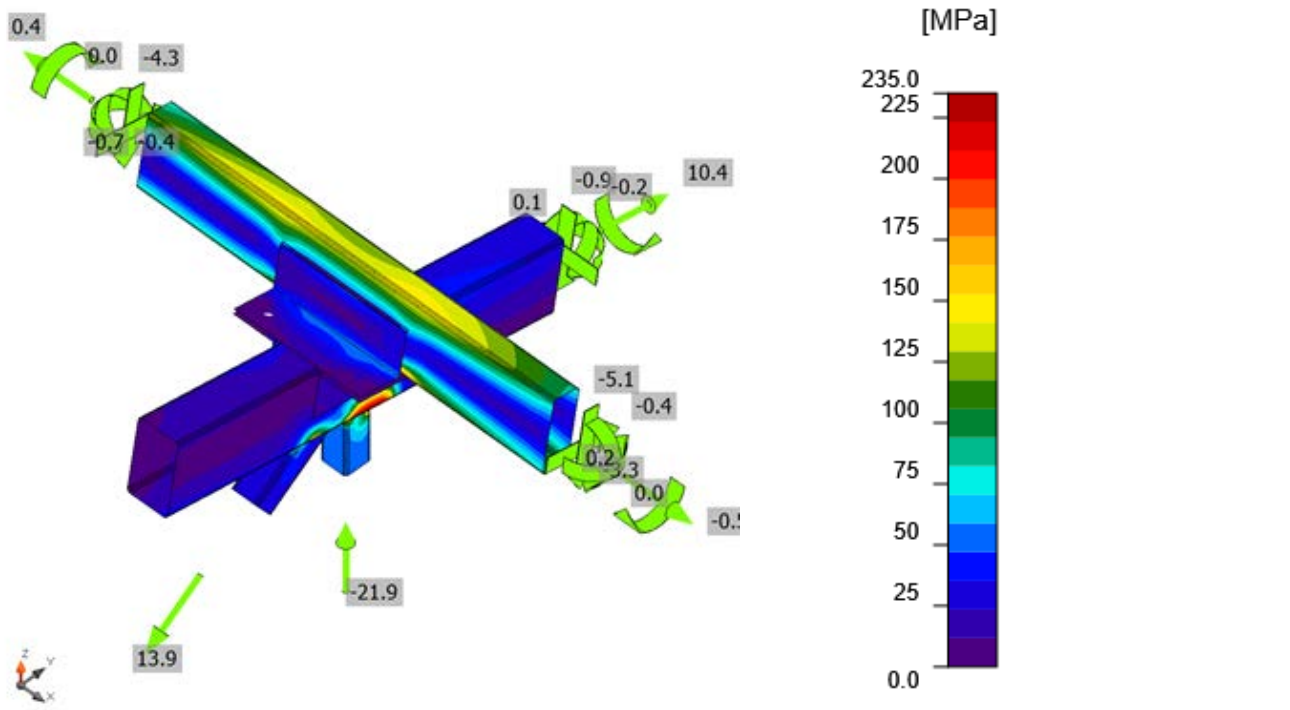


Overall check, ULS-Set(2)



Strain check, ULS-Set(2)

Project:	**Veza rožnjače i krovnog nosača**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**



Equivalent stress, ULS-Set(2)

Bolts

	Name	Loads	$F_{t,Ed}$ [kN]	V [kN]	Ut_t [%]	$F_{b,Rd}$ [kN]	Ut_s [%]	Ut_{ts} [%]	Status
	B1	ULS-Set(1)	0.5	2.5	0.9	38.0	7.8	8.4	OK
	B2	ULS-Set(1)	1.1	1.6	2.3	42.0	4.9	6.6	OK
	B3	ULS-Set(1)	3.9	1.5	8.1	39.4	4.8	10.5	OK
	B4	ULS-Set(1)	2.7	2.7	5.5	40.6	8.5	12.4	OK

Design data

Name	$F_{t,Rd}$ [kN]	$B_{p,Rd}$ [kN]	$F_{v,Rd}$ [kN]
M12 8.8 - 1	48.4	65.1	32.3

Project:	**Veza rožnjače i krovnog nosača**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

Symbol explanation

$F_{t,Rd}$	Bolt tension resistance EN 1993-1-8 tab. 3.4
$F_{t,Ed}$	Tension force
$B_{p,Rd}$	Punching shear resistance
V	Resultant of shear forces Vy, Vz in bolt
$F_{v,Rd}$	Bolt shear resistance EN_1993-1-8 table 3.4
$F_{b,Rd}$	Plate bearing resistance EN 1993-1-8 tab. 3.4
Ut_t	Utilization in tension
Ut_s	Utilization in shear
Ut_{ts}	Utilization in tension and shear EN 1993-1-8 table 3.4

Welds (Plastic redistribution)

Item	Edge	Throat th. [mm]	Length [mm]	Loads	$\sigma_{w,Ed}$ [MPa]	ε_{Pl} [%]	σ_U [MPa]	$\tau_{\parallel}$ [MPa]	τ_U [MPa]	Ut [%]	Ut_c [%]	Status
B166-w 4	SM1-w 1	◢3.0	180	ULS-Set(1)	116.9	0.0	-36.4	-55.1	-32.9	32.5	6.8	OK
B166-w 4	SM1-w 1	◢3.0	180	ULS-Set(4)	318.3	0.0	60.6	-174.0	-47.5	88.4	25.3	OK
B166-w 2	SM2-w 1	◢3.0	180	ULS-Set(1)	108.4	0.0	22.9	56.5	-23.5	30.1	6.7	OK
B166-w 2	SM2-w 1	◢3.0	180	ULS-Set(4)	249.8	0.0	42.1	136.3	40.6	69.4	20.6	OK
B130-w 2	SM3-w 1	◢3.0	160	ULS-Set(1)	125.6	0.0	-34.2	-59.8	36.0	34.9	6.6	OK
B130-w 2	SM3-w 1	◢3.0	160	ULS-Set(2)	47.6	0.0	27.6	-7.4	21.1	13.2	9.8	OK
B130-w 4	SM4-w 1	◢3.0	160	ULS-Set(1)	124.5	0.0	-30.7	61.2	-33.2	34.6	7.5	OK
B130-w 4	SM4-w 1	◢3.0	160	ULS-Set(2)	58.4	0.0	-33.5	-13.9	23.9	16.2	9.5	OK
B130-w 1	B137	◢3.0	141	ULS-Set(2)	353.3	0.4	-146.1	-185.7	0.2	98.1	34.6	OK
B130-w 1	B143	◢3.0	167	ULS-Set(2)	254.5	0.0	172.5	104.9	-25.5	70.7	19.4	OK

Design data

	β_w [-]	$\sigma_{w,Rd}$ [MPa]	0.9 σ [MPa]
S 235	0.80	360.0	259.2

Symbol explanation

ε_{Pl}	Strain
$\sigma_{w,Ed}$	Equivalent stress
$\sigma_{w,Rd}$	Equivalent stress resistance
$\sigma_{\perp}$	Perpendicular stress
$\tau_{\parallel}$	Shear stress parallel to weld axis
$\tau_{\perp}$	Shear stress perpendicular to weld axis
0.9 σ	Perpendicular stress resistance - 0.9*fu/γM2
β_w	Corelation factor EN 1993-1-8 tab. 4.1
Ut	Utilization
Utc	Weld capacity utilization

Buckling

Buckling analysis was not calculated.

Project:	**Montažmi nastavak rožnjače**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

Material

Steel	S 235

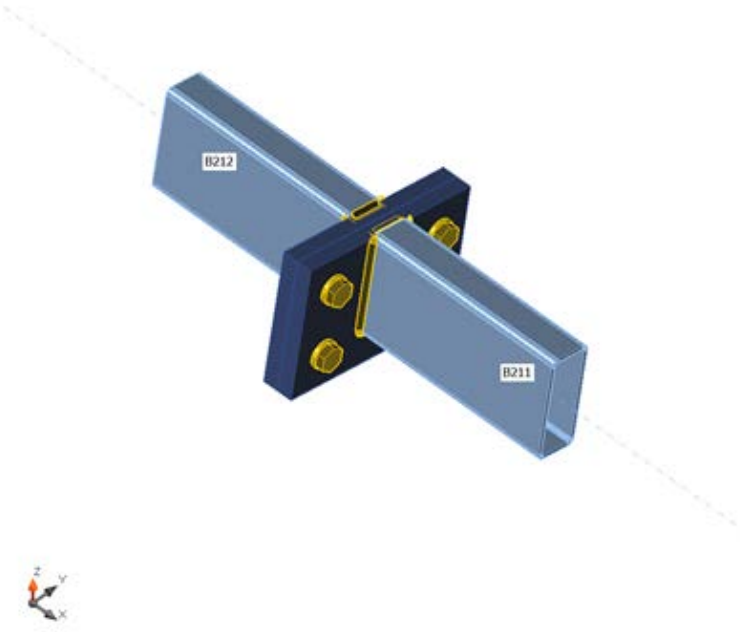
Project item Con N221

Design

Name	Con N221
Description	
Analysis	Stress, strain/ loads in equilibrium

Beams and columns

Name	Cross-section	β – Direction [°]	γ - Pitch [°]	α - Rotation [°]	Offset ex [mm]	Offset ey [mm]	Offset ez [mm]	Forces in
B211	1 - CFRHS100X40X3(RHS100x40)	0.0	0.0	-10.0	0	0	0	Position
B212	1 - CFRHS100X40X3(RHS100x40)	180.0	0.0	10.0	0	0	0	Position



Cross-sections

Name	Material
1 - CFRHS100X40X3(RHS100x40)	S 235

Project:	**Montažmi nastavak rožnjače**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

Bolts

Name	Bolt assembly	Diameter [mm]	fu [MPa]	Gross area [mm^2]
M12 10.9	M12 10.9	12	1000.0	113

Load effects (forces in equilibrium)

Name	Member	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
ULS-Set(1)	B211	1.9	0.0	0.2	0.0	0.1	0.0
	B212	1.9	0.0	-0.2	0.0	0.1	0.0
ULS-Set(2)	B211	-0.6	0.2	-0.7	0.0	-0.5	-0.1
	B212	-0.6	0.2	0.7	0.0	-0.5	0.1
ULS-Set(3)	B211	0.8	0.2	-0.7	0.0	-0.5	-0.1
	B212	0.8	0.2	0.7	0.0	-0.5	0.1
ULS-Set(7)	B211	-0.4	0.2	-0.9	0.0	-0.6	-0.1
	B212	-0.4	0.2	0.9	0.0	-0.6	0.1
ULS-Set(9)	B211	-0.4	0.2	-0.9	0.0	-0.6	-0.1
	B212	-0.4	0.2	0.9	0.0	-0.6	0.1
ULS-Set(10)	B211	0.2	0.1	-0.2	0.0	-0.2	-0.1
	B212	0.2	0.1	0.2	0.0	-0.2	0.1
Sy(11)	B211	0.0	0.0	0.0	0.0	0.0	0.0
	B212	0.0	0.0	0.0	0.0	0.0	0.0

Check

Summary

Name	Value	Status
Analysis	100.0%	OK
Plates	0.0 < 5%	OK
Bolts	7.6 < 100%	OK
Welds	36.3 < 100%	OK
Buckling	Not calculated	
GMNA	Calculated	

Plates

Name	Thickness [mm]	Loads	σ_{Ed} [MPa]	ε_{Pl} [%]	Status
B211	3.0	ULS-Set(9)	75.5	0.0	OK
B212	3.0	ULS-Set(9)	77.5	0.0	OK
PP1a	15.0	ULS-Set(9)	26.2	0.0	OK
PP1b	15.0	ULS-Set(9)	25.7	0.0	OK

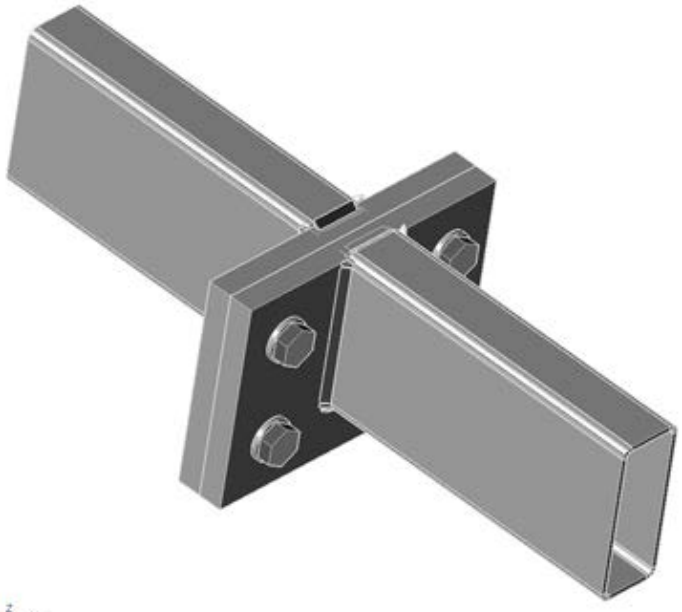
Design data

Material	f_y [MPa]	ε_{lim} [%]
S 235	235.0	5.0

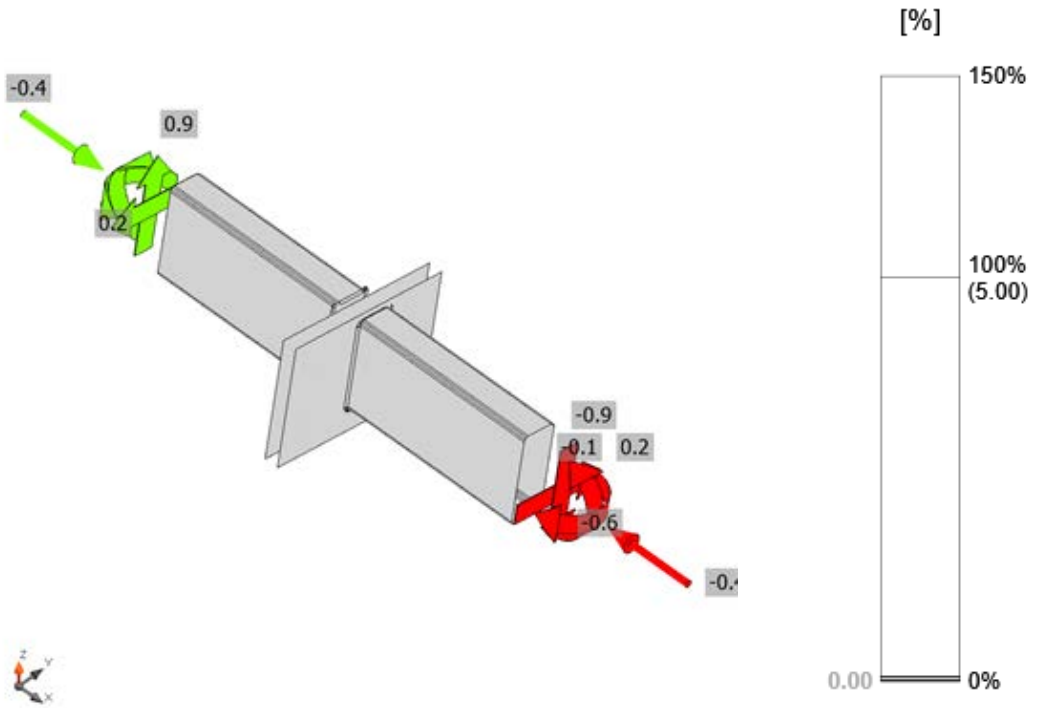
Project:	**Montažmi nastavak rožnjače**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

Symbol explanation

ε_{Pl}	Strain
σ_{Ed}	Eq. stress
f_y	Yield strength
ε_{lim}	Limit of plastic strain

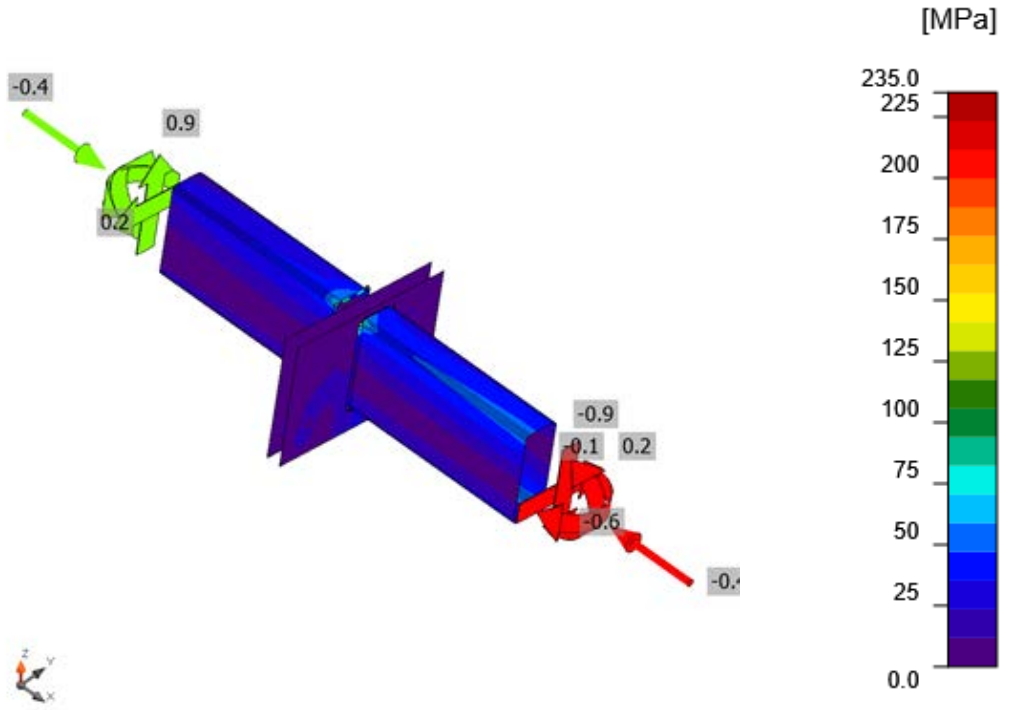


Overall check, ULS-Set(9)



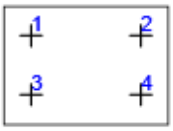
Project:	**Montažmi nastavak rožnjače**
Project no:	**51 - IDP/2022**
Author:	**Imre Kekenj, mast.inž.građ.**

Strain check, ULS-Set(9)



Equivalent stress, ULS-Set(9)

Bolts

	Name	Loads	$F_{t,Ed}$ [kN]	V [kN]	Ut_t [%]	$F_{b,Rd}$ [kN]	Ut_s [%]	Ut_{ts} [%]	Status
	B1	ULS-Set(1)	1.9	0.0	3.1	107.5	0.1	2.4	OK
	B2	ULS-Set(1)	2.2	0.0	3.6	107.3	0.1	2.7	OK
	B3	ULS-Set(7)	3.8	0.2	6.4	110.9	0.6	5.2	OK
	B4	ULS-Set(9)	4.6	0.2	7.6	111.0	0.7	6.1	OK

Design data

Name	$F_{t,Rd}$ [kN]	$B_{p,Rd}$ [kN]	$F_{v,Rd}$ [kN]
M12 10.9 - 1	60.5	187.3	33.6

Symbol explanation

$F_{t,Rd}$	Bolt tension resistance EN 1993-1-8 tab. 3.4
$F_{t,Ed}$	Tension force
$B_{p,Rd}$	Punching shear resistance
V	Resultant of shear forces Vy, Vz in bolt
$F_{v,Rd}$	Bolt shear resistance EN_1993-1-8 table 3.4
$F_{b,Rd}$	Plate bearing resistance EN 1993-1-8 tab. 3.4
Ut_t	Utilization in tension
Ut_s	Utilization in shear
Ut_{ts}	Utilization in tension and shear EN 1993-1-8 table 3.4

Project:	**Montažmi nastavak rožnjače**
Project no:	**51 - IDP/2022**
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Welds (Plastic redistribution)

Item	Edge	Throat th. [mm]	Length [mm]	Loads	$\sigma_{w,Ed}$ [MPa]	ε_{Pl} [%]	σ_U [MPa]	$\tau_{\parallel}$ [MPa]	τ_U [MPa]	Ut [%]	Ut_c [%]	Status
PP1a	B211	◢3.0	253	ULS-Set(9)	130.8	0.0	-57.9	32.1	59.6	36.3	9.6	OK
PP1b	B212	◢3.0	253	ULS-Set(9)	127.3	0.0	-69.2	-13.8	60.1	35.4	9.0	OK

Design data

	β_w [-]	$\sigma_{w,Rd}$ [MPa]	0.9 σ [MPa]
S 235	0.80	360.0	259.2

Symbol explanation

ε_{Pl}	Strain
$\sigma_{w,Ed}$	Equivalent stress
$\sigma_{w,Rd}$	Equivalent stress resistance
$\sigma_{\perp}$	Perpendicular stress
$\tau_{\parallel}$	Shear stress parallel to weld axis
$\tau_{\perp}$	Shear stress perpendicular to weld axis
0.9 σ	Perpendicular stress resistance - 0.9*fu/γM2
β_w	Corelation factor EN 1993-1-8 tab. 4.1
Ut	Utilization
Utc	Weld capacity utilization

Buckling

Buckling analysis was not calculated.

Zglobna veza sa zavrtnjima - kategorija spoja: A, D i AD

Veza krovnog sprega 40x3

Merodavni uticaji:

N=	0.000	kN
T2=	4.790	kN
T3=	0.000	kN
T=	4.790	kN

Upotrebljeni vijci:
2 M 12 k.č. 8.8
SRPS EN 15048-1/15048-2
EN ISO 4014 (DIN931)

Zadovoljava

Uticaji za 1 vijak:

N=	0.000	kN	sila zatezanja
T2=	2.395	kN	
T3=	0.000	kN	
T=	2.395	kN	sila smicanja

1. Nosivost zavrtnjeva u smičućim spojevima:

1.1. Nosivost zavrtnja na smicanje

Prečnik zavrtnja:	d =	1.2	cm	
Prečnik rupe:	d_0 =	1.3	cm	
Površina preseka zavrtnja:	$A = d^2\pi/4$ =	1.131	cm²	
Površina ispitnog preseka:	A_s =	0.843	cm²	primeniti kad je navoj u paketu!
Sečnost zavrtnja:	m =	1		
	α_v =	0.6		→ tabela 3.4
zavisno od materijala zavrtnja:	f_{ub} =	80	kN/cm²	→ tabela 3.1
zavisno od materijala osnovnog mat.:	f_u =	36	kN/cm²	
zavisno od materijala osnovnog mat.:	f_y =	23.5	kN/cm²	
	γ_{M2} =	1.25		
	γ_{M0} =	1		

Nosivost vijka na smicanje:

$F_{v,Rd} = (m * \alpha_v * f_{ub} * A) / \gamma_{M2}$ = 32.371 kN

1.2. Nosivost zavrtnja na pritisak po omotaču rupe:

Debljina paketa lima:	Σt=	0.8	cm
Rastojanje između vijaka:			
Krajnje rastojanje - u pravcu sile	e_1 =	35	mm
Ivično rastojanje - upravno na sil	e_2 =	25	mm
Razmak - u pravcu sile	p_1 =	60	mm
Razmak - upravno na silu	p_2 =	40	mm

ivični red k_1 je manji od:

$k_1 = 2.8*(e_2/d_0) - 1.7$ → k_1 = 52.146

k1 = 2.5 → k_1 = 2.5 → k_1 = 2.500

unutrašnji red k_1 je manji od:

$k_1 = 1.4*(p_2/d_0) - 1.7$ → k_1 = 41.377

k1 = 2.5 → k_1 = 2.5 → k_1 = 2.500

usvojeno za proračun → k_1 = 2.500

α_b je manji od: α_d, f_{ub} / f_u, 1

krajnji red: $\alpha_d = e_1 / 3d_0$ = 8.974

unutrašnji red: $\alpha_d = (p_1 / 3d_0) - 1/4$ = 15.135

f_{ub} / f_u = 2.222

α_b = 1

usvojeno za proračun → α_b = 1.000

Nosivost vijka na pritisak po omotaču rupe:

$F_{b,rd} = (k_1 * \alpha_b * f_u * d * t) / \gamma_{M2} =$ 69.120 kN

Merodavna nosivost na smicanje:

$F_{v,rd} =$ 32.371 kN

2. Nosivost zavrtnjeva u zatežućim spojevima:

2.1. Nosivost zavrtnja na zatezanje:

Površina ispitnog preseka: $A_s =$ 0.843 cm²

$k_2 =$ 0.900

Nosivost vijka na zatezanje:

$F_{t,rd} = (k_2 * f_{ub} * A_s) / \gamma_{M2} =$ 48.5568 kN

2.2. Nosivost na probijanje smicanjem:

Prečnik ispod glave vijka: $d_m =$ 2.050 cm → tabela 6.1

Najmanja debljina lima: $t_p =$ 0.8 cm

Nosivost na probijanje smicanjem:

$B_{p,Rd} = (0.6 * \pi * d_m * t_p * f_u) / \gamma_{M2} =$ 89.0302 kN

Merodavna nosivost na zatezanje:

$F_{t,rd} =$ 48.557 kN

3. Kombinovano naprezanje:

$(F_{v,Ed} / F_{v,Rd}) + (F_{t,Ed} / (1.4*F_{t,Rd})) \leq 1$

$(F_{v,Ed} / F_{v,Rd}) + (F_{t,Ed} / (1.4*F_{t,Rd})) =$ 0.074 ≤1

Izabrani vijak: Zadovoljava

Usvojeno: 2 M 12 k.č. 8.8

SRPS EN 15048-1/15048-2

EN ISO 4014 (DIN931)

4. Uticaj dugačke veze:

Ne $L_j =$ 60 mm > 15*d = 180 mm

$\beta_{Lf} = 1 - ((L_j - 15*d) / (200*d)) =$ 1.500 !!! $0.75 \leq \beta Lf \leq 1$

$\beta_{Lf} =$ 1.000

Merodavna nosivost na smicanje:

$F_{v,Rd} * \beta_{Lf} =$ 32.371

5. Kombinovano naprezanje dugačke veze:

$(F_{v,Ed} / F_{v,Rd}) + (F_{t,Ed} / (1.4*F_{t,Rd})) \leq 1$

$(F_{v,Ed} / F_{v,Rd}) + (F_{t,Ed} / (1.4*F_{t,Rd})) =$ 0.074 ≤1

Izabrani vijak: Zadovoljava

Usvojeno: 2 M 12 k.č. 8.8

SRPS EN 15048-1/15048-2

EN ISO 4014 (DIN931)

6. Cepanje bloka za simetrične grupe zavrtnjeva

Neto površina izložena zatezanju: A_{nt} = 2.080 cm²

Neto površina izložena smicanju: A_{nv} = 4.480 cm²

$V_{eff,1,Rd} = ((f_u * A_{nt}) / \gamma_{M2}) + ((1/\sqrt{3}) * f_y * A_{nv} / \gamma_{M0})$ = 120.687 kN

Presek JE OTPORAN na cepanje bloka

7. Zavarivanje

Sve elemente sklopa međusobno zavariti 100%. Debljina svih neobeleženih ugaonih šavova iznosi aw=0,7tmin (70% najtanjeg elementa u vezi), osim kod veza šupljih profila kod kojih je aw=tmin (debljina lima profila).

Biro za projektovanje i inženjering
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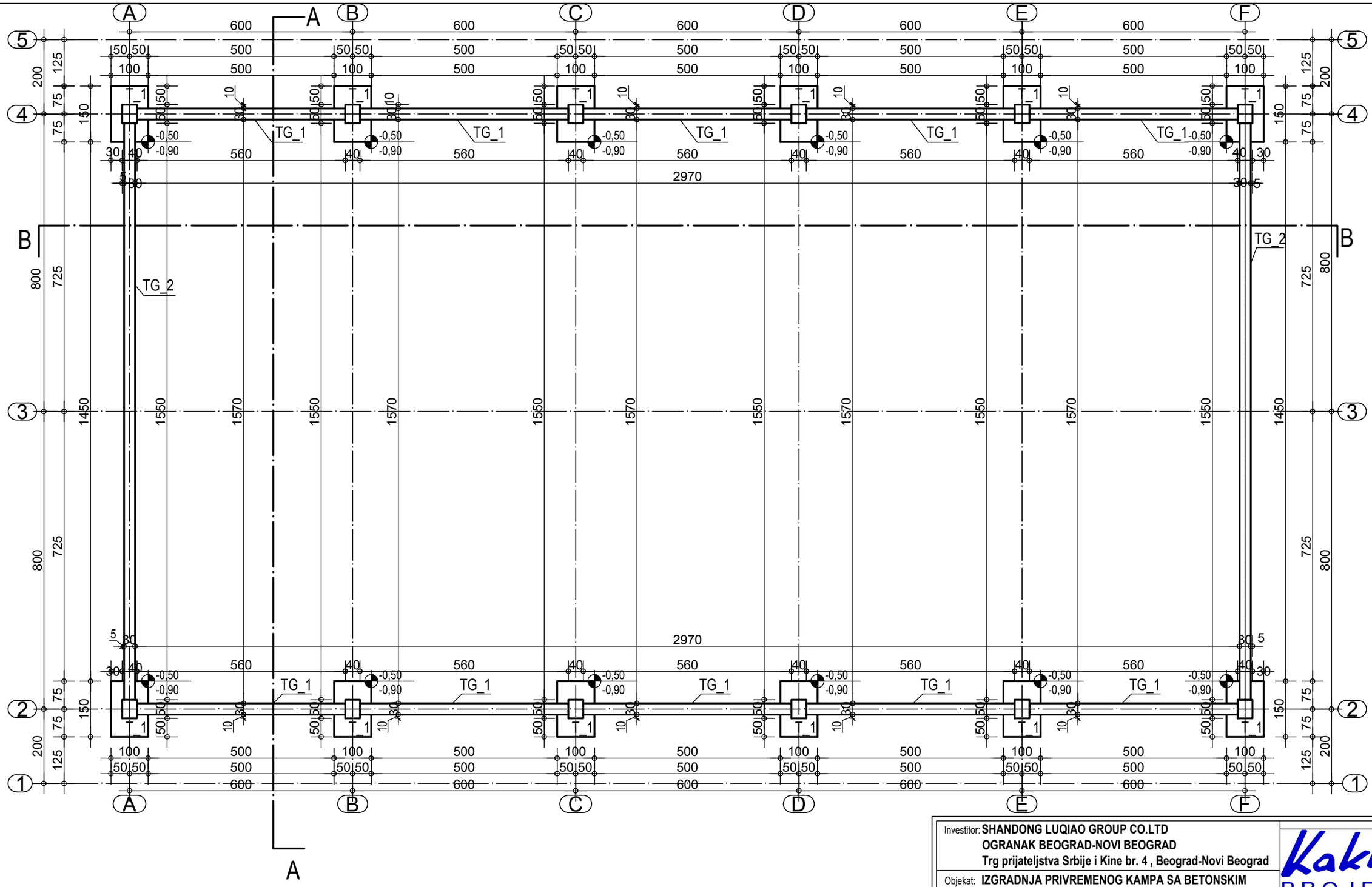
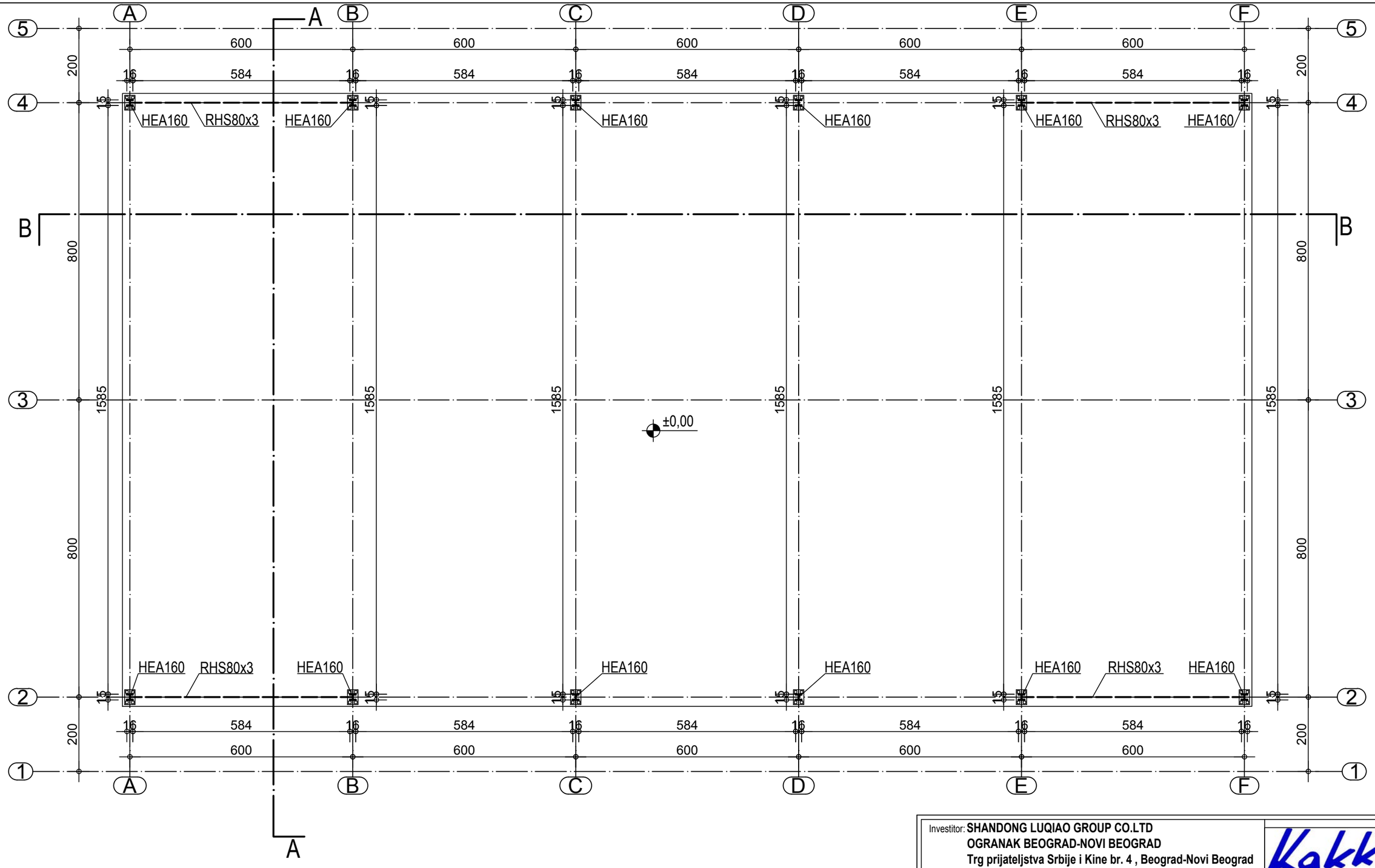
e-mail: kakkproject@gmail.com

2.7. GRAFIČKA DOKUMENTACIJA

1 -	OSNOVA TEMELJA - NADSTREŠNICA	R=1:100
2 -	OSNOVA PRIZEMLJA - NADSTREŠNICA	R=1:100
3 -	OSNOVA KROVA - NADSTREŠNICA	R=1:100
4 -	PRESECI A-A i B-B - NADSTREŠNICA	R=1:100
5 -	OSNOVA TEMELJA – RECEPCIJA, KUHINJA i TRPEZARIJA	R=1:100
6 -	OSNOVA PRIZEMLJA – RECEPCIJA, KUHINJA i TRPEZARIJA	R=1:100
7 -	OSNOVA KROVA – RECEPCIJA, KUHINJA i TRPEZARIJA	R=1:100
8 -	PRESEK C-C – RECEPCIJA, KUHINJA i TRPEZARIJA	R=1:50
9 -	KONSTRUKCIJA U OSAMA A i 1 - RECEPCIJA, KUHINJA i TRPEZARIJA	R=1:75
10 -	KONSTRUKCIJA U OSAMA B i 8 - RECEPCIJA, KUHINJA i TRPEZARIJA	R=1:75
11 -	OSNOVA TEMELJA – KANCELARIJE	R=1:100
12 -	OSNOVA PRIZEMLJA – KANCELARIJE	R=1:100
13 -	OSNOVA KROVA – KANCELARIJE	R=1:100
14 -	PRESEK D-D – KANCELARIJE	R=1:50
15 -	KONSTRUKCIJA U OSAMA A i 1 – KANCELARIJE	R=1:75
16 -	KONSTRUKCIJA U OSAMA B i 8 – KANCELARIJE	R=1:75
17 -	OSNOVA TEMELJA – SMEŠTAJ RADNIKA	R=1:100
18 -	OSNOVA PRIZEMLJA – SMEŠTAJ RADNIKA	R=1:100
19 -	OSNOVA KROVA – SMEŠTAJ RADNIKA	R=1:100
20 -	PRESEK E-E – SMEŠTAJ RADNIKA	R=1:50
21 -	KONSTRUKCIJA U OSAMA A i 1 – SMEŠTAJ RADNIKA	R=1:75
22 -	KONSTRUKCIJA U OSAMA B i 8 – SMEŠTAJ RADNIKA	R=1:75
23 -	OSNOVA TEMELJA – SANITARNI BLOK	R=1:100
24 -	OSNOVA PRIZEMLJA – SANITARNI BLOK	R=1:100
25 -	OSNOVA KROVA – SANITARNI BLOK	R=1:100
26 -	PRESEK F-F – SANITARNI BLOK	R=1:50
27 -	KONSTRUKCIJA U OSAMA A i 1 – SANITARNI BLOK	R=1:75
28 -	KONSTRUKCIJA U OSAMA B i 7 – SANITARNI BLOK	R=1:75



Investitor: **SHANDONG LUQIAO GROUP CO.LTD** **OGRANAK BEOGRAD-NOVI BEOGRAD** **Trg prijateljstva Srbije i Kine br. 4 , Beograd-Novi Beograd**	Kakkk PROJECT
Objekat: **IZGRADNJA PRIVREMENOG KAMPA SA BETONSKIM POGONOM**	
Mesto i adresa gradnje: **br.kat.par.6170, 6171, 6172, 6173, 6174/1, 6174/4, 6174/6 K.O. B.Topola**	Broj projekta: **51 - IDP / 2022**
Vrsta tehničke dokumentacije: **IDP - 2. PROJEKAT KONSTRUKCIJE**	Datum: **Mart 2022 god.**
Naziv crteža: **OSNOVA TEMELJA - NADSTREŠNICA**	Razmera: **R=1:100**
Odgovorni projektant: **Imre Kekenj, mast.inž.građ. br. licence: 310 P025 16**	Kekenj Imre
Saradnik: **Atila Takač građ. tehn.**	Broj lista: **List br. 1**



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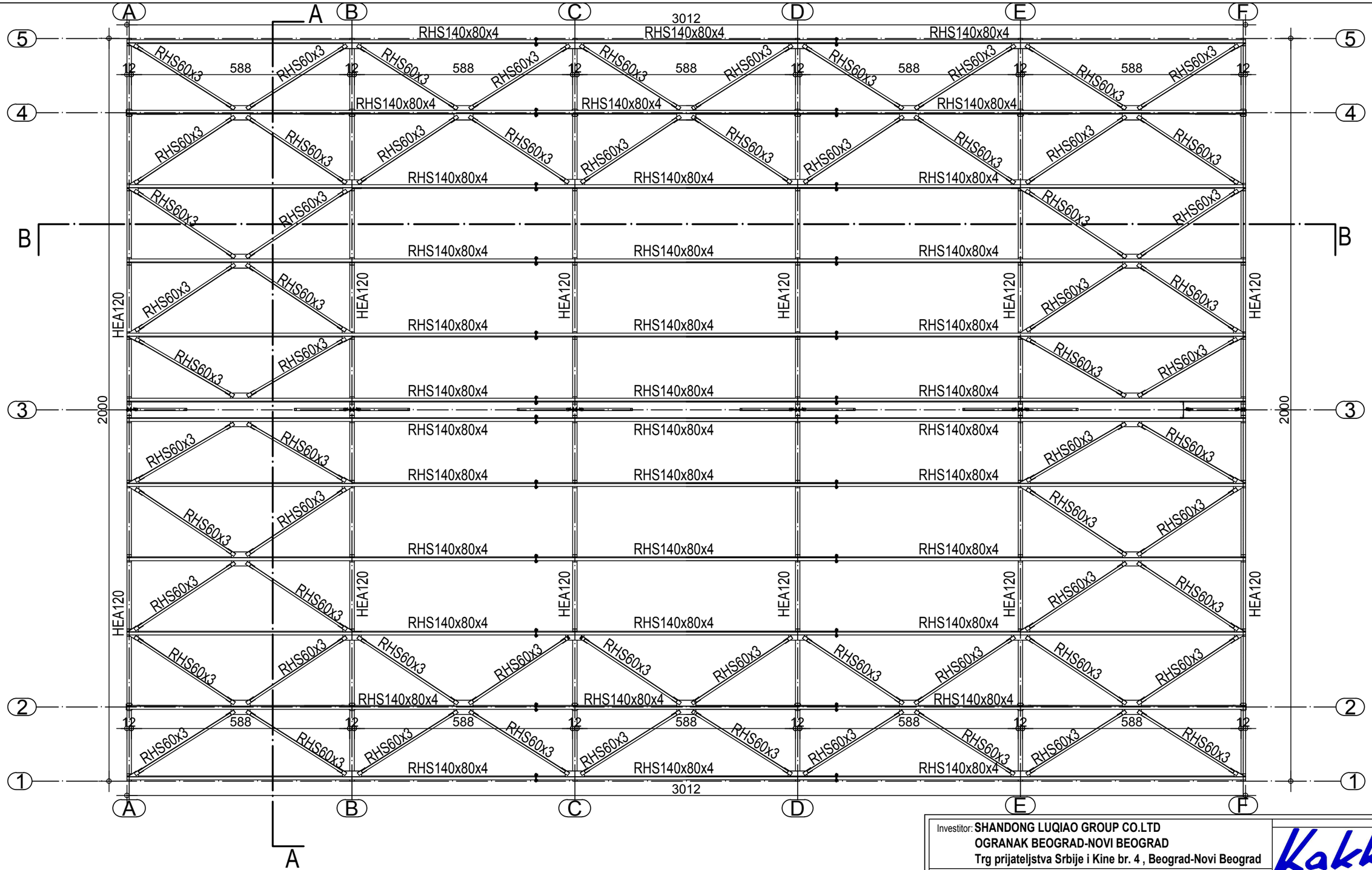
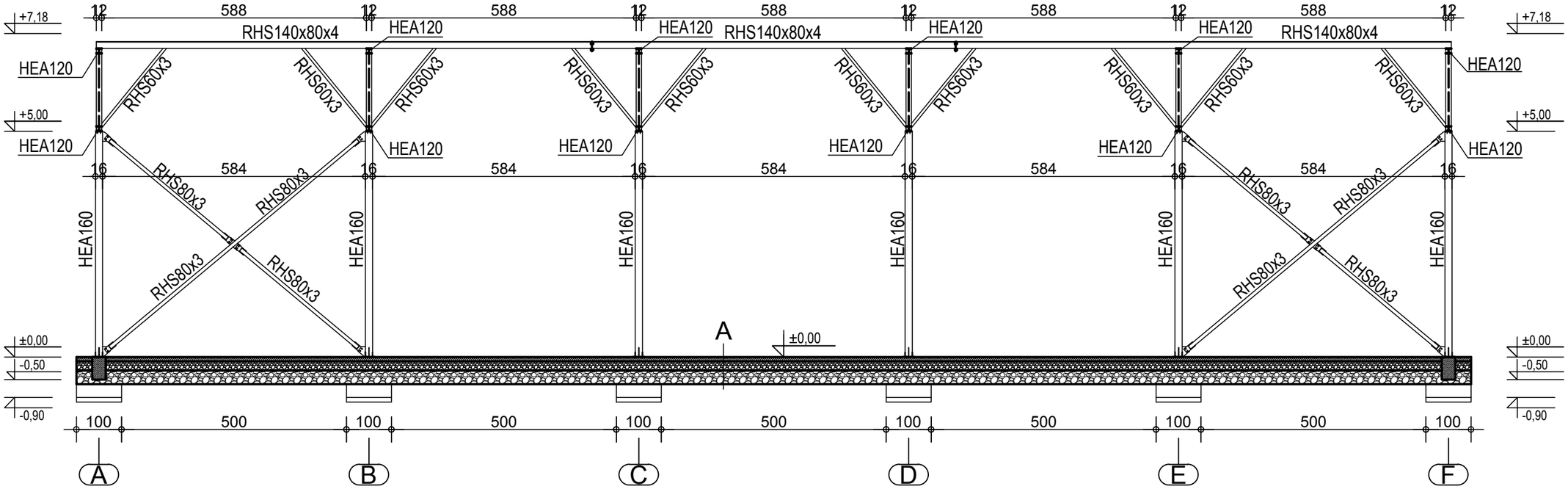
Objekat: **IZGRADNJA PRIVREMENOG KAMPA SA BETONSKIM POGONOM**	
Mesto i adresa gradnje: **br.kat.par.6170, 6171, 6172, 6173, 6174/1, 6174/4, 6174/6 K.O. B.Topola**	Broj projekta: **51 - IDP / 2022**
Vrsta tehničke dokumentacije: **IDP - 2. PROJEKAT KONSTRUKCIJE**	Datum: **Mart 2022 god.**
Naziv crteža: **OSNOVA PRIZEMLJA - NADSTREŠNICA**	Razmera: **R=1:100**
Odgovorni projektant: **Imre Kekenj, mast.inž.građ. br. licence: 310 P025 16**	Kekenj Imre
Saradnik: **Atila Takač građ. tehn.**	Broj lista: **List br. 2**

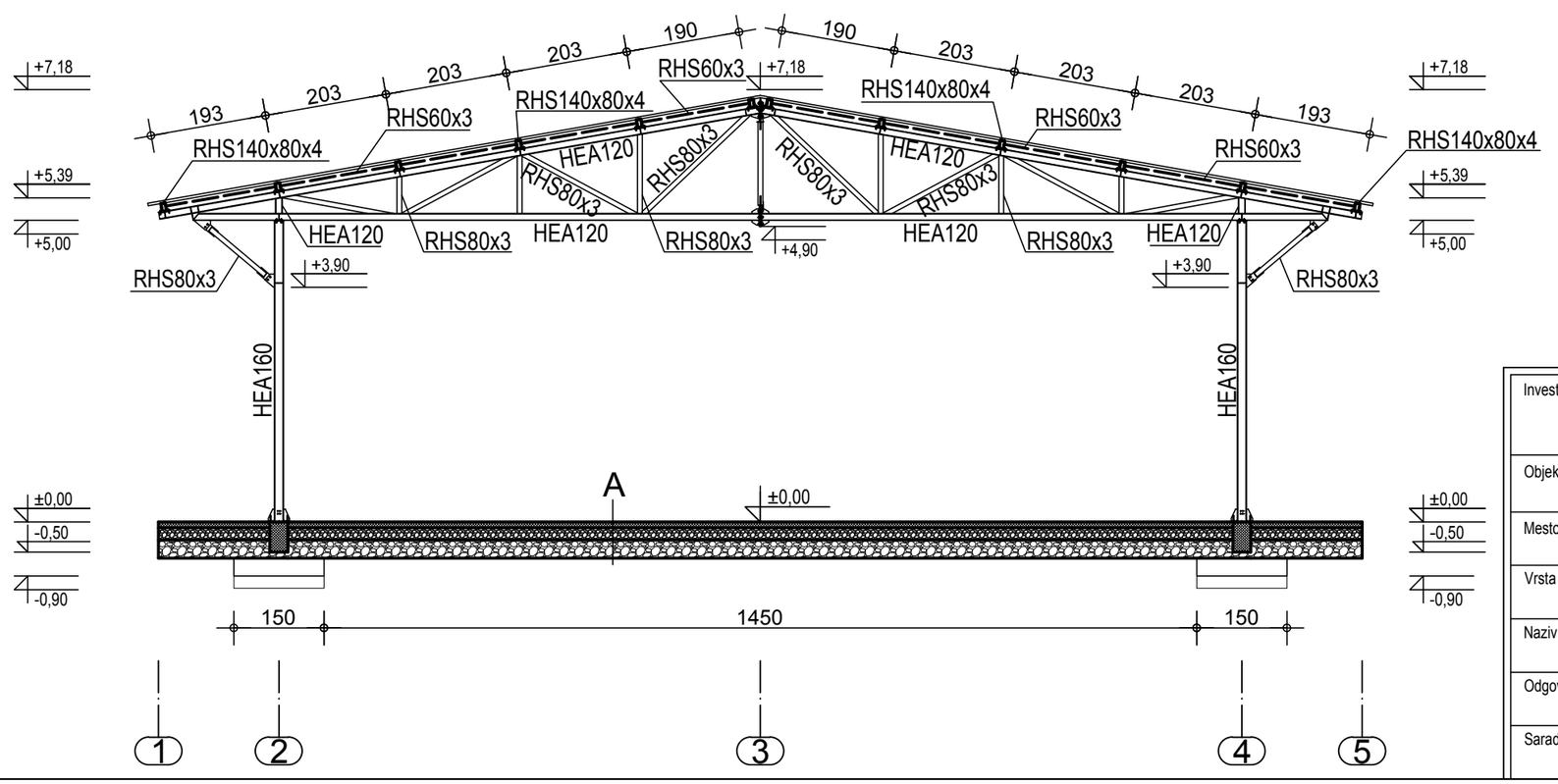


Investitor: **SHANDONG LUQIAO GROUP CO.LTD** **OGRANAK BEOGRAD-NOVI BEOGRAD** **Trg prijateljstva Srbije i Kine br. 4 , Beograd-Novi Beograd**	Kakkk PROJECT
Objekat: **IZGRADNJA PRIVREMENOG KAMPA SA BETONSKIM POGONOM**	
Mesto i adresa gradnje: **br.kat.par.6170, 6171, 6172, 6173, 6174/1, 6174/4, 6174/6 K.O. B.Topola**	Broj projekta: **51 - IDP / 2022**
Vrsta tehničke dokumentacije: **IDP - 2. PROJEKAT KONSTRUKCIJE**	Datum: **Mart 2022 god.**
Naziv crteža: **OSNOVA KROVA - NADSTREŠNICA**	Razmera: **R=1:100**
Odgovorni projektant: **Imre Kekenj, mast.inž.građ. br. licence: 310 P025 16**	Kekenj Imre
Saradnik: **Atila Takač građ. tehn.**	Broj lista: **List br. 3**

PRESEK B-B



PRESEK A-A



A
-Betonski pod d=10cm
-Zbijeni tucanik 0-31mm; d=20cm; Ms=50MPa
-Zbijeni tucanik 31-63mm; d=30cm; Ms=40MPa
-Nabijeno podtlo Ms=25MPa

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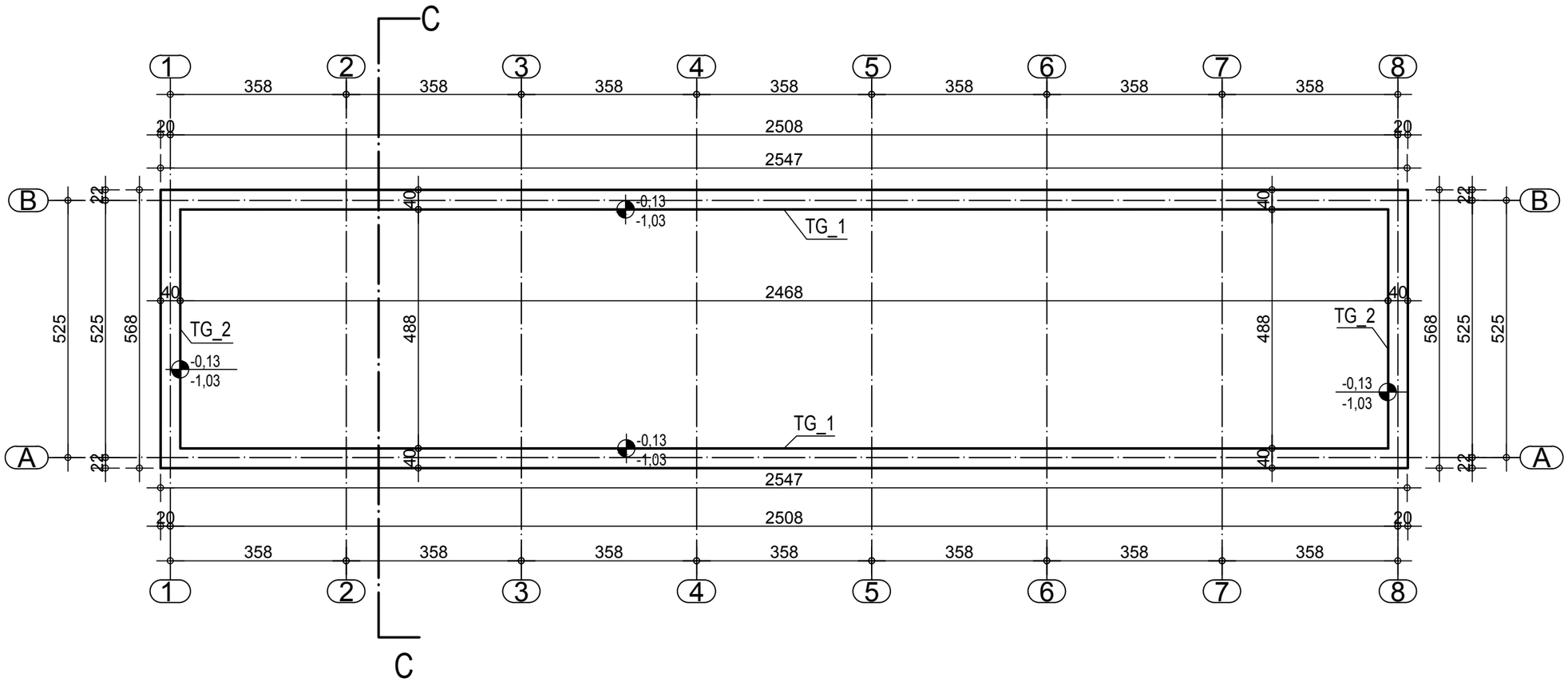
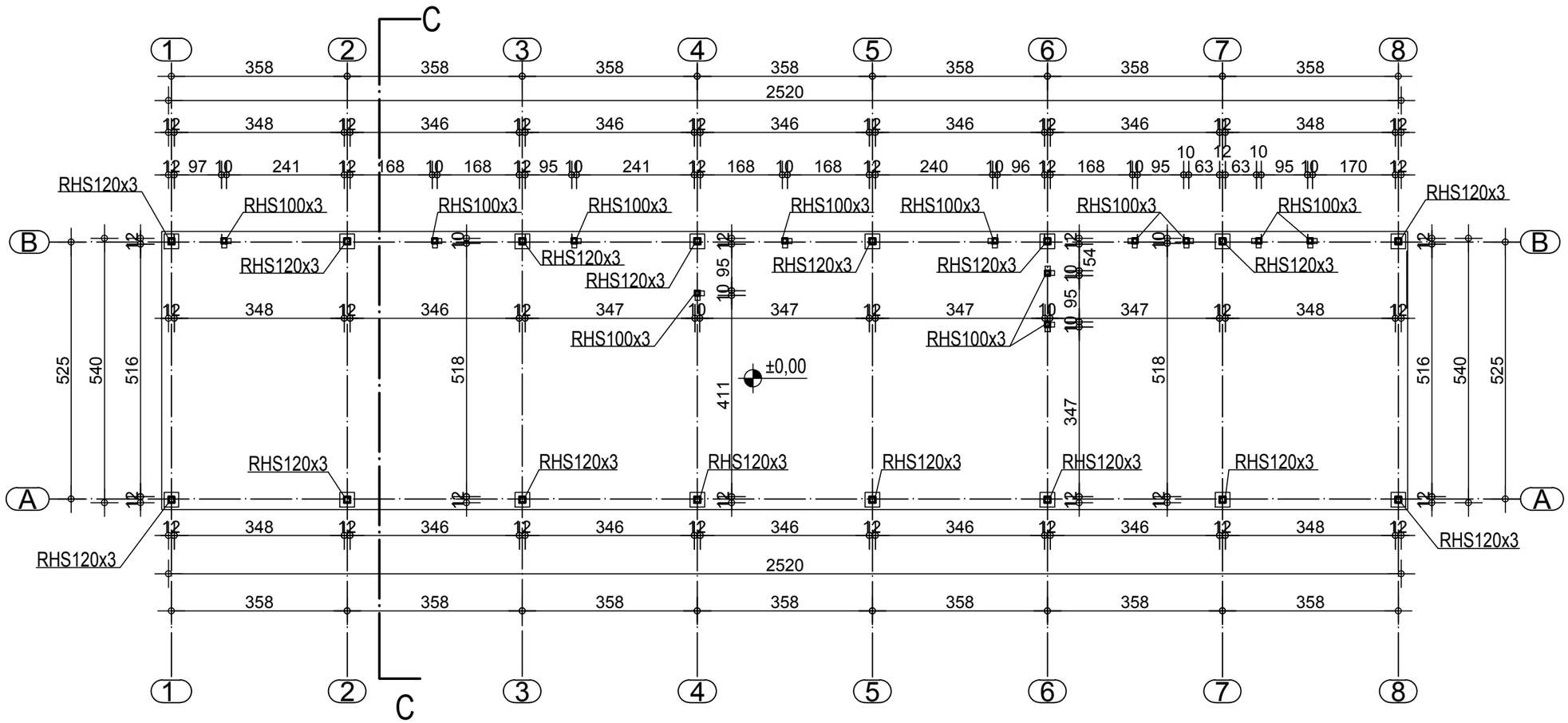
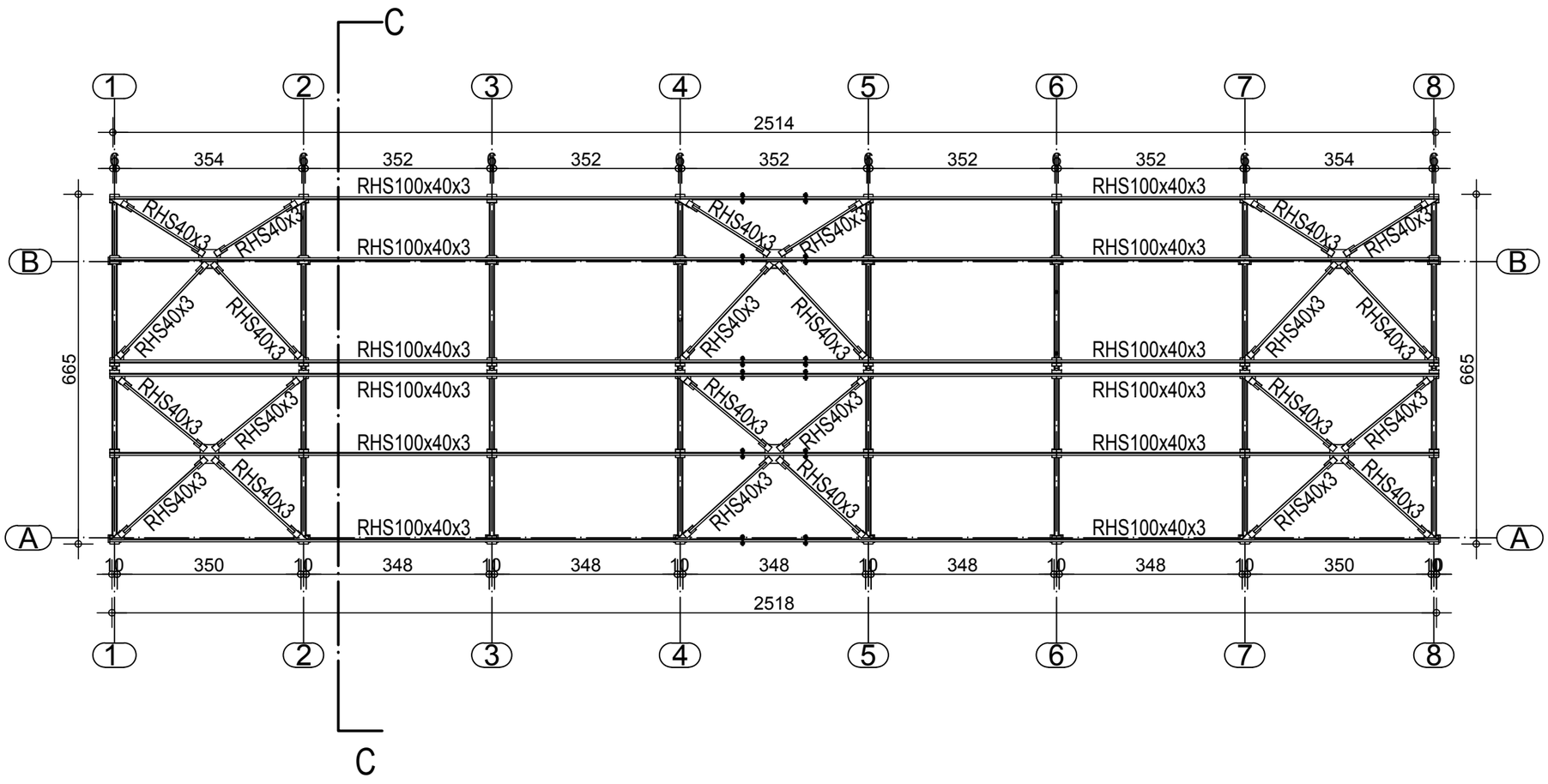
Objekat: **IZGRADNJA PRIVREMENOG KAMPA SA BETONSKIM POGONOM**	
Mesto i adresa gradnje: **br.kat.par.6170, 6171, 6172, 6173, 6174/1, 6174/4, 6174/6 K.O. B.Topola**	Broj projekta: **51 - IDP / 2022**
Vrsta tehničke dokumentacije: **IDP - 2. PROJEKAT KONSTRUKCIJE**	Datum: **Mart 2022 god.**
Naziv crteža: **PRESECI A-A , B-B - NADSTREŠNICA**	Razmera: **R=1:100**
Odgovorni projektant: **Imre Kekenj, mast.inž.građ. br. licence: 310 P025 16**	Kekenj Imre
Saradnik: **Atila Takač građ. tehn.**	Broj lista: **List br. 4**



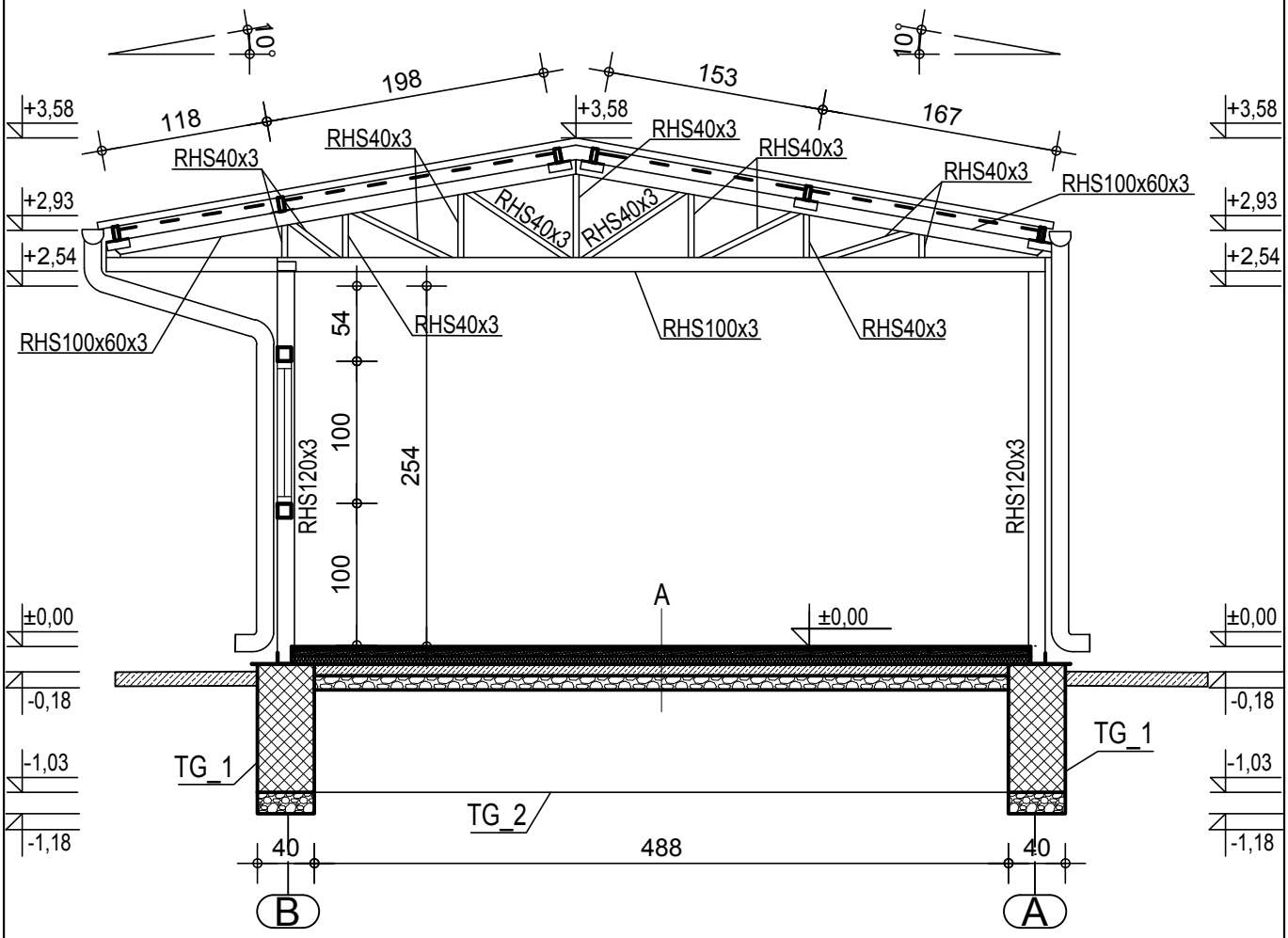
Investitor: **SHANDONG LUQIAO GROUP CO.LTD** **OGRANAK BEOGRAD-NOVI BEOGRAD** **Trg prijateljstva Srbije i Kine br. 4 , Beograd-Novi Beograd**	Kakkk PROJECT
Objekat: **IZGRADNJA PRIVREMENOG KAMPA SA BETONSKIM POGONOM**	
Mesto i adresa gradnje: **br.kat.par.6170, 6171, 6172, 6173, 6174/1, 6174/4, 6174/6 K.O. B.Topola**	Broj projekta: **51 - IDP / 2022**
Vrsta tehničke dokumentacije: **IDP - 2. PROJEKAT KONSTRUKCIJE**	Datum: **Mart 2022 god.**
Naziv crteža: **OSNOVA TEMELJA - RECEPCIJA , KUHINJA I TRPEZARIJA**	Razmera: **R=1:100**
Odgovorni projektant: **Imre Kekenj, mast.inž.građ. br. licence: 310 P025 16**	Kekenj Imre
Saradnik: **Atila Takač građ. tehn.**	Broj lista: **List br. 5**



Investitor: **SHANDONG LUQIAO GROUP CO.LTD** **OGRANAK BEOGRAD-NOVI BEOGRAD** **Trg prijateljstva Srbije i Kine br. 4 , Beograd-Novi Beograd**	Kakkk PROJECT
Objekat: **IZGRADNJA PRIVREMENOG KAMPA SA BETONSKIM POGONOM**	
Mesto i adresa gradnje: **br.kat.par.6170, 6171, 6172, 6173, 6174/1, 6174/4, 6174/6 K.O. B.Topola**	Broj projekta: **51 - IDP / 2022**
Vrsta tehničke dokumentacije: **IDP - 2. PROJEKAT KONSTRUKCIJE**	Datum: **Mart 2022 god.**
Naziv crteža: **OSNOVA PRIZEMLJA - RECEPCIJA , KUHINJA I TRPEZARIJA**	Razmera: **R=1:100**
Odgovorni projektant: **Imre Kekenj, mast.inž.građ. br. licence: 310 P025 16**	Kekenj Imre
Saradnik: **Atila Takač građ. tehn.**	Broj lista: **List br. 6**



Investitor: **SHANDONG LUQIAO GROUP CO.LTD** **OGRANAK BEOGRAD-NOVI BEOGRAD** **Trg prijateljstva Srbije i Kine br. 4 , Beograd-Novi Beograd**	Kakkk PROJECT
Objekat: **IZGRADNJA PRIVREMENOG KAMPA SA BETONSKIM POGONOM**	
Mesto i adresa gradnje: **br.kat.par.6170, 6171, 6172, 6173, 6174/1, 6174/4, 6174/6 K.O. B.Topola**	Broj projekta: **51 - IDP / 2022**
Vrsta tehničke dokumentacije: **IDP - 2. PROJEKAT KONSTRUKCIJE**	Datum: **Mart 2022 god.**
Naziv crteža: **OSNOVA KROVA - RECEPCIJA , KUHINJA I TRPEZARIJA**	Razmera: **R=1:100**
Odgovorni projektant: **Imre Kekenj, mast.inž.građ. br. licence: 310 P025 16**	Kekenj Imre
Saradnik: **Atila Takač građ. tehn.**	Broj lista: **List br. 7**

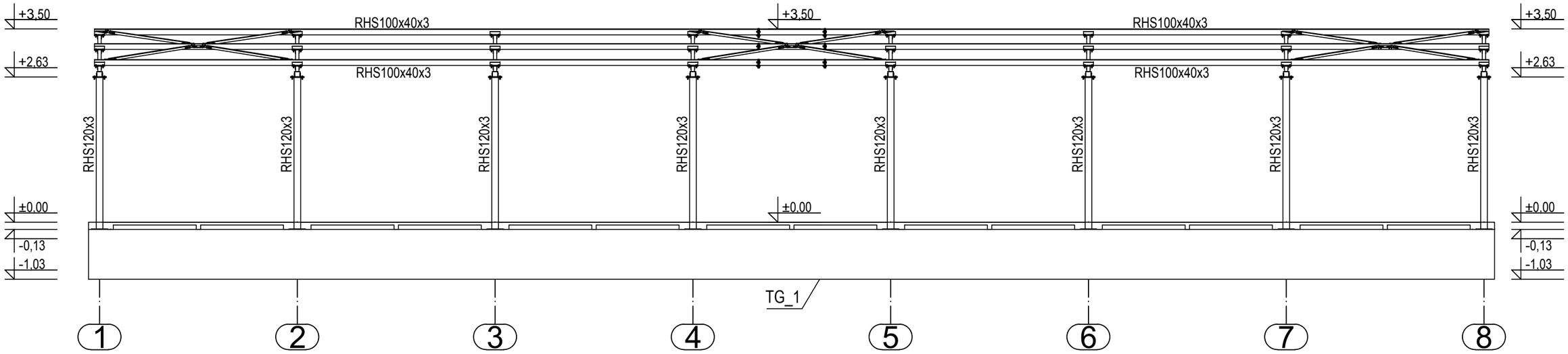


A

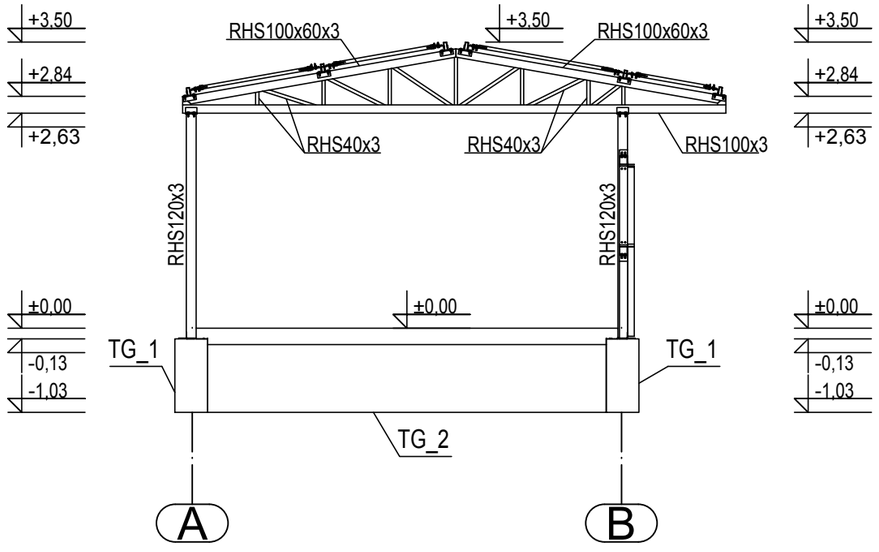
-KER.PLOČICE
-KOŠULJICA 5CM
-TERMOIZOLACIJA 5cm
-HIDROIZOLACIJA
-NABIJENI BETON 8CM
-ŠLJUNAK 10cm
-NABIJENO PODTLO

Investitor: **SHANDONG LUQIAO GROUP CO.LTD OGRANAK BEOGRAD-NOVI BEOGRAD Trg prijateljstva Srbije i Kine br. 4 , Beograd-Novi Beograd**	Kakkk PROJECT
Objekat: **IZGRADNJA PRIVREMENOG KAMPA SA BETONSKIM POGONOM**	
Mesto i adresa gradnje: **br.kat.par.6170, 6171, 6172, 6173, 6174/1, 6174/4, 6174/6 K.O. B.Topola**	Broj projekta: **51 - IDP / 2022**
Vrsta tehničke dokumentacije: **IDP - 2. PROJEKAT KONSTRUKCIJE**	Datum: **Mart 2022 god.**
Naziv crteža: **PRESEK C-C RECEPCIJA , KUHINJA I TRPEZARIJA**	Razmera: **R=1:50**
Odgovorni projektant: **Imre Kekenj, mast.inž.građ. br. licence: 310 P025 16**	
Saradnik: **Atila Takač građ. tehn.**	Broj lista: **List br. 8**

Konstrukcija u osi A

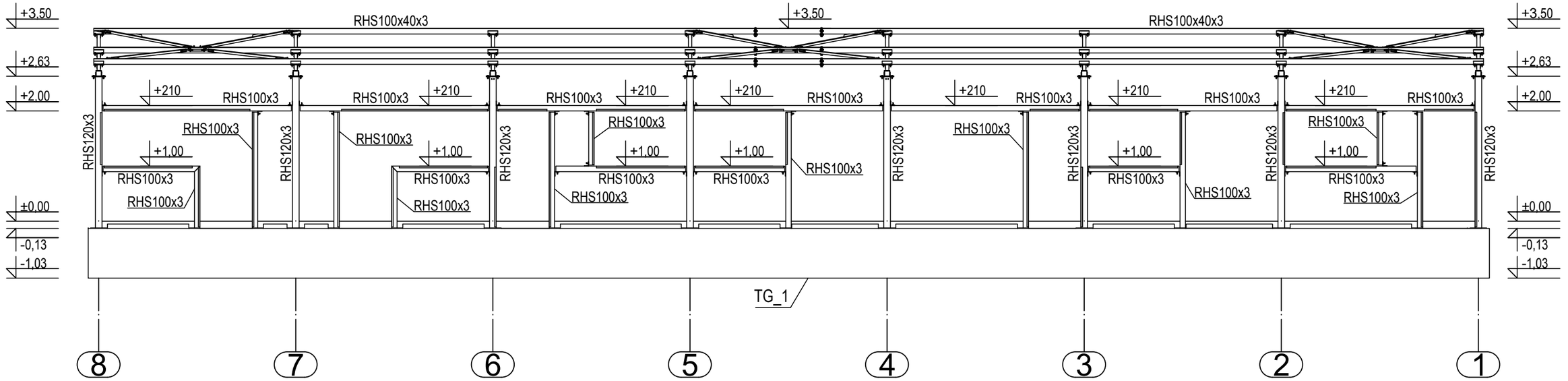


Konstrukcija u osi 1

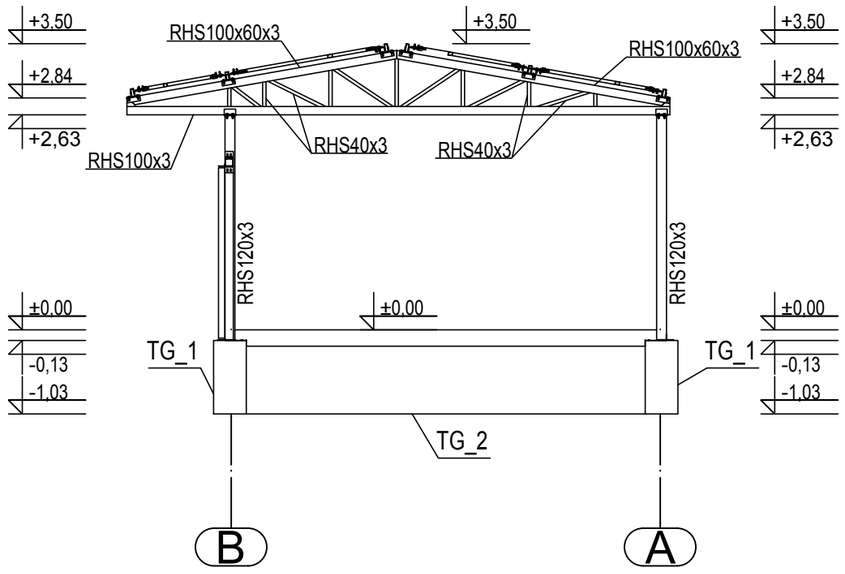


Investitor: **SHANDONG LUQIAO GROUP CO.LTD OGRANAK BEOGRAD-NOVI BEOGRAD Trg prijateljstva Srbije i Kine br. 4 , Beograd-Novi Beograd**	Kakkk PROJECT
Objekat: **IZGRADNJA PRIVREMENOG KAMPA SA BETONSKIM POGONOM**	
Mesto i adresa gradnje: **br.kat.par.6170, 6171, 6172, 6173, 6174/1, 6174/4, 6174/6 K.O. B.Topola**	Broj projekta: **51 - IDP / 2022**
Vrsta tehničke dokumentacije: **IDP - 2. PROJEKAT KONSTRUKCIJE**	Datum: **Mart 2022 god.**
Naziv crteža: **KONSTRUKCIJA U OSI - A , 1 RECEPCIJA , KUHINJA I TRPEZARIJA**	Razmera: **R=1:75**
Odgovorni projektant: **Imre Kekenj, mast.inž.građ. br. licence: 310 P025 16**	Kekenj Imre
Saradnik: **Atila Takač građ. tehn.**	Broj lista: **List br. 9**

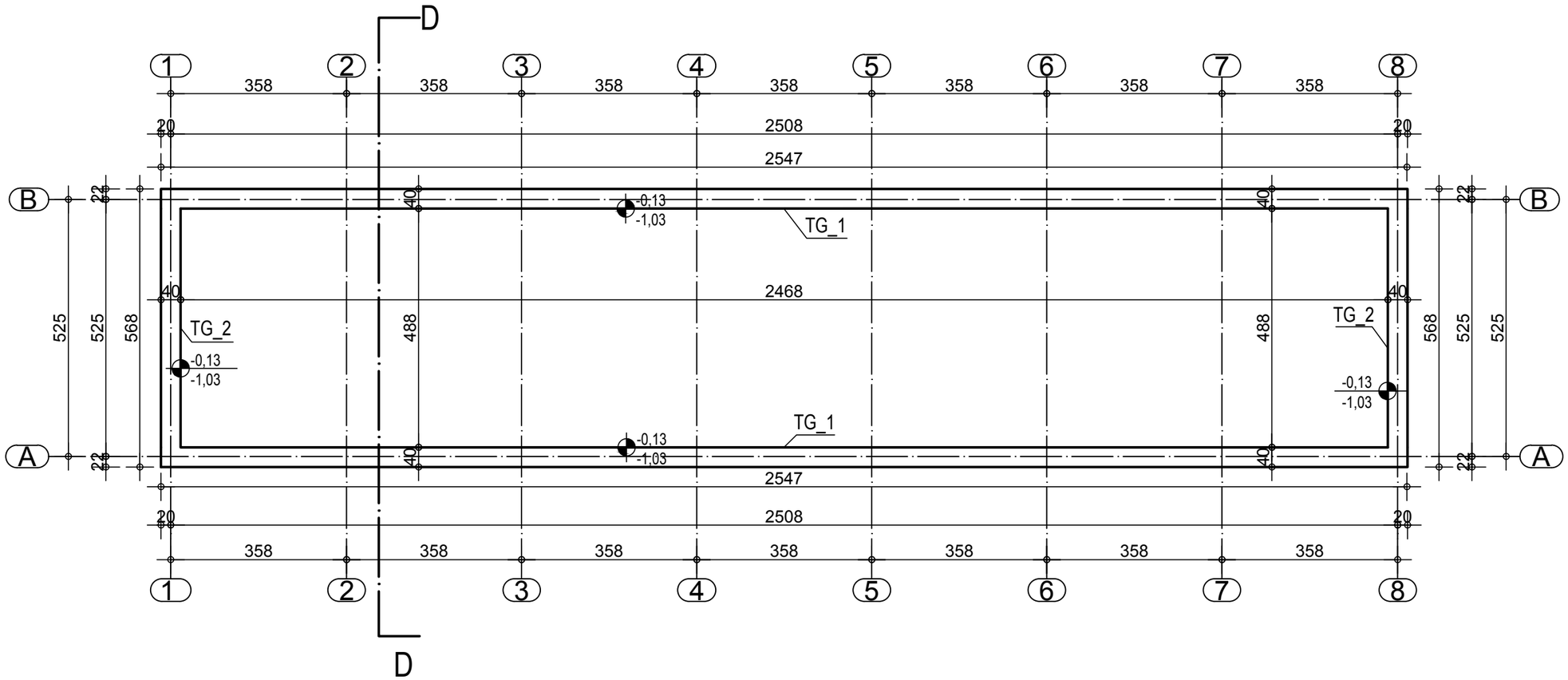
Konstrukcija u osi B



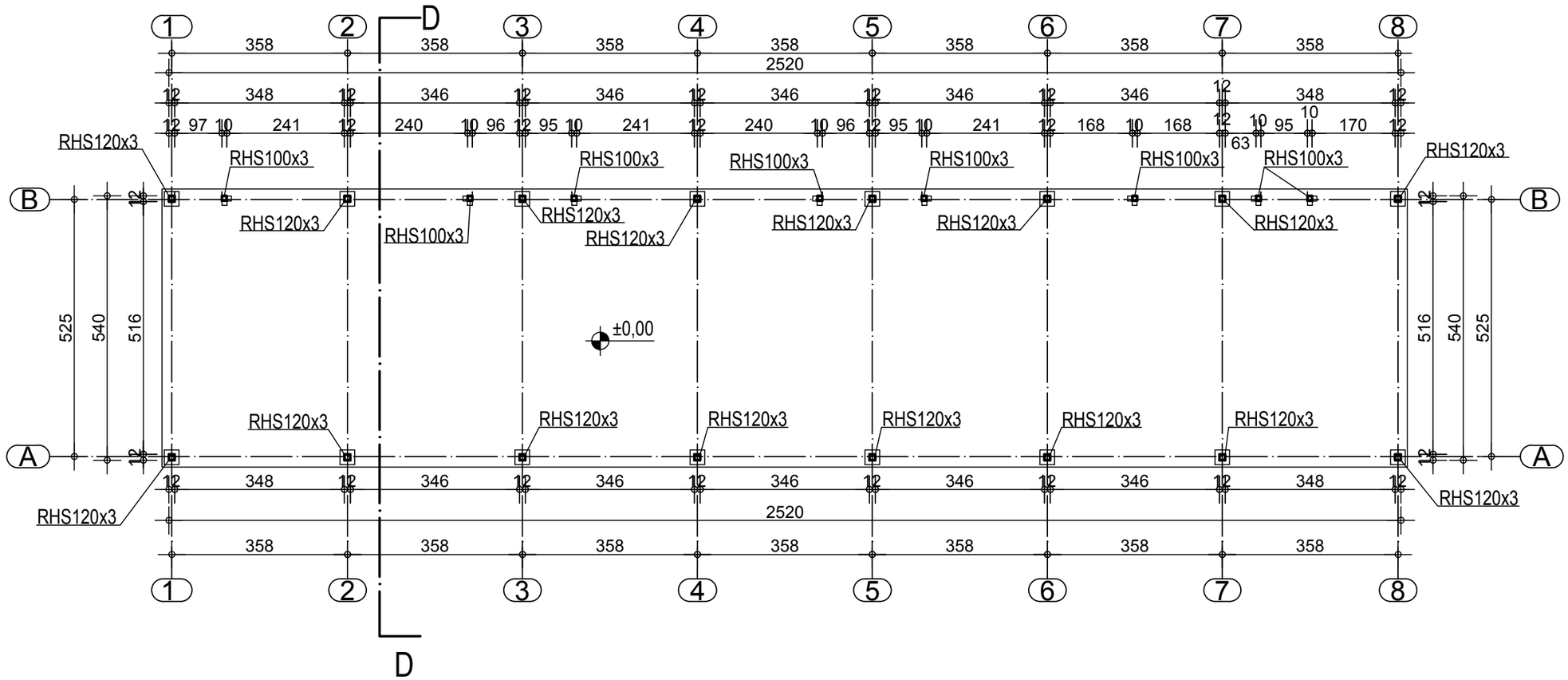
Konstrukcija u osi 8



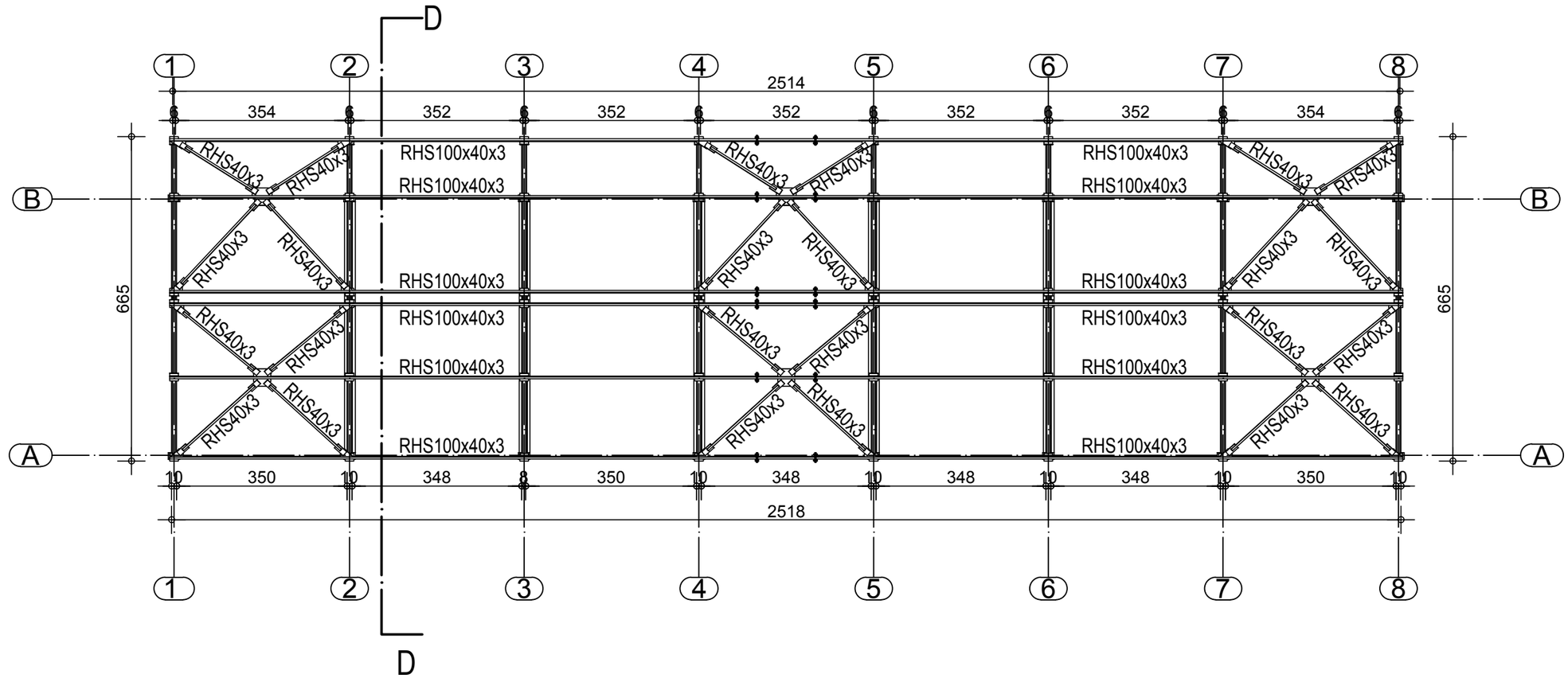
Investitor: **SHANDONG LUQIAO GROUP CO.LTD OGRANAK BEOGRAD-NOVI BEOGRAD Trg prijateljstva Srbije i Kine br. 4 , Beograd-Novi Beograd**	Kakkk PROJECT
Objekat: **IZGRADNJA PRIVREMENOG KAMPA SA BETONSKIM POGONOM**	
Mesto i adresa gradnje: **br.kat.par.6170, 6171, 6172, 6173, 6174/1, 6174/4, 6174/6 K.O. B.Topola**	Broj projekta: **51 - IDP / 2022**
Vrsta tehničke dokumentacije: **IDP - 2. PROJEKAT KONSTRUKCIJE**	Datum: **Mart 2022 god.**
Naziv crteža: **KONSTRUKCIJA U OSI - B , 8 RECEPCIJA , KUHINJA I TRPEZARIJA**	Razmera: **R=1:75**
Odgovorni projektant: **Imre Kekenj, mast.inž.građ. br. licence: 310 P025 16**	Kekenj Imre
Saradnik: **Atila Takač građ. tehn.**	Broj lista: **List br. 10**



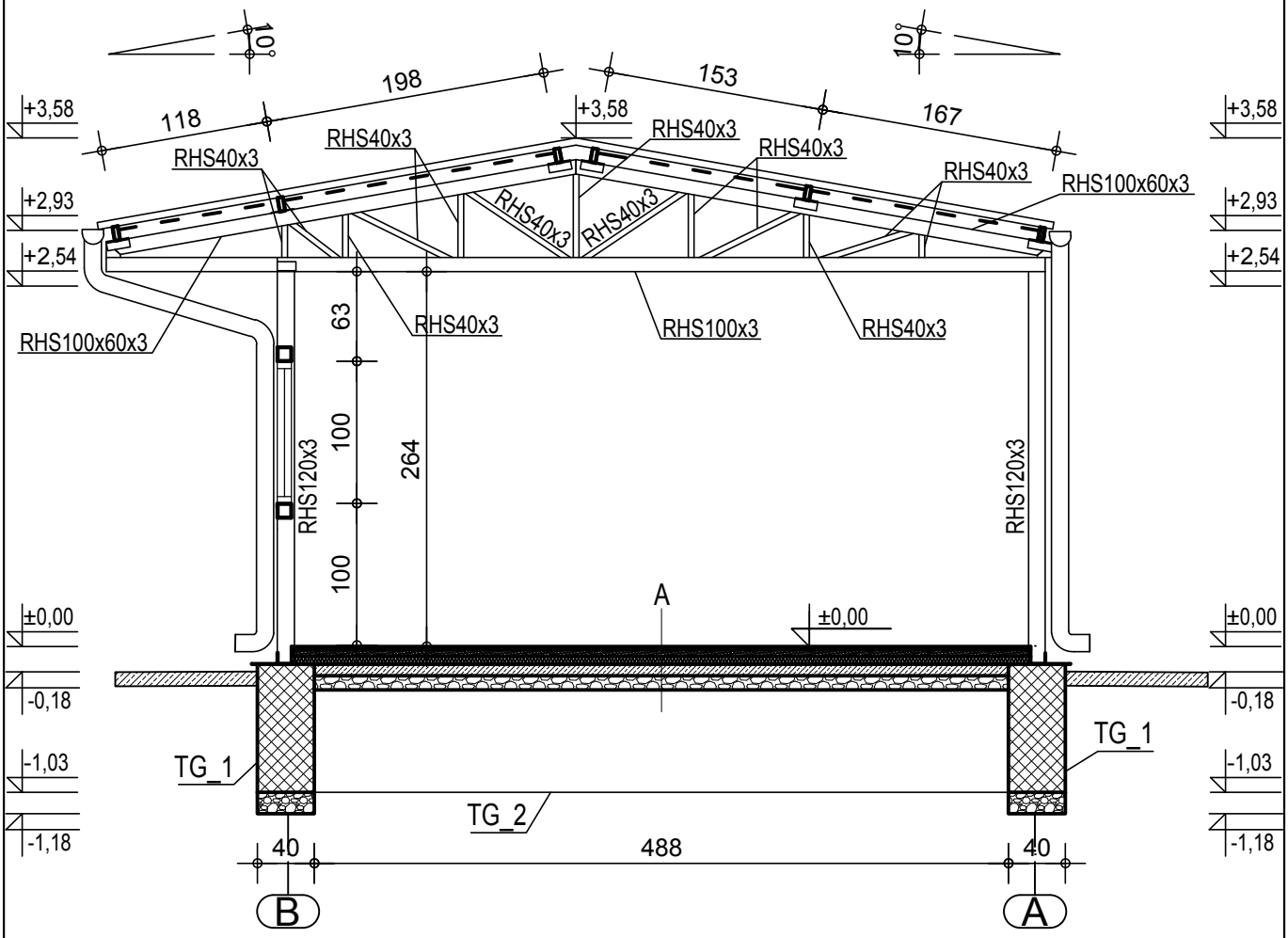
Investitor: **SHANDONG LUQIAO GROUP CO.LTD** **OGRANAK BEOGRAD-NOVI BEOGRAD** **Trg prijateljstva Srbije i Kine br. 4 , Beograd-Novi Beograd**	Kakkk PROJECT
Objekat: **IZGRADNJA PRIVREMENOG KAMPA SA BETONSKIM POGONOM**	
Mesto i adresa gradnje: **br.kat.par.6170, 6171, 6172, 6173, 6174/1, 6174/4, 6174/6 K.O. B.Topola**	Broj projekta: **51 - IDP / 2022**
Vrsta tehničke dokumentacije: **IDP - 2. PROJEKAT KONSTRUKCIJE**	Datum: **Mart 2022 god.**
Naziv crteža: **OSNOVA TEMELJA - KANCELARIJE**	Razmera: **R=1:100**
Odgovorni projektant: **Imre Kekenj, mast.inž.građ. br. licence: 310 P025 16**	Kekenj Imre
Saradnik: **Atila Takač građ. tehn.**	Broj lista: **List br. 11**



Investitor: **SHANDONG LUQIAO GROUP CO.LTD** **OGRANAK BEOGRAD-NOVI BEOGRAD** **Trg prijateljstva Srbije i Kine br. 4 , Beograd-Novi Beograd**	Kakkk PROJECT
Objekat: **IZGRADNJA PRIVREMENOG KAMPA SA BETONSKIM POGONOM**	
Mesto i adresa gradnje: **br.kat.par.6170, 6171, 6172, 6173, 6174/1, 6174/4, 6174/6 K.O. B.Topola**	Broj projekta: **51 - IDP / 2022**
Vrsta tehničke dokumentacije: **IDP - 2. PROJEKAT KONSTRUKCIJE**	Datum: **Mart 2022 god.**
Naziv crteža: **OSNOVA PRIZEMLJA - KANCELARIJE**	Razmera: **R=1:100**
Odgovorni projektant: **Imre Kekenj, mast.inž.građ. br. licence: 310 P025 16**	Kekenj Imre
Saradnik: **Atila Takač građ. tehn.**	Broj lista: **List br. 12**



Investitor: **SHANDONG LUQIAO GROUP CO.LTD** **OGRANAK BEOGRAD-NOVI BEOGRAD** **Trg prijateljstva Srbije i Kine br. 4 , Beograd-Novi Beograd**	Kakkk PROJECT
Objekat: **IZGRADNJA PRIVREMENOG KAMPA SA BETONSKIM POGONOM**	
Mesto i adresa gradnje: **br.kat.par.6170, 6171, 6172, 6173, 6174/1, 6174/4, 6174/6 K.O. B.Topola**	Broj projekta: **51 - IDP / 2022**
Vrsta tehničke dokumentacije: **IDP - 2. PROJEKAT KONSTRUKCIJE**	Datum: **Mart 2022 god.**
Naziv crteža: **OSNOVA KROVA - KANCELARIJE**	Razmera: **R=1:100**
Odgovorni projektant: **Imre Kekenj, mast.inž.građ. br. licence: 310 P025 16**	Kekenj Imre
Saradnik: **Atila Takač građ. tehn.**	Broj lista: **List br. 13**

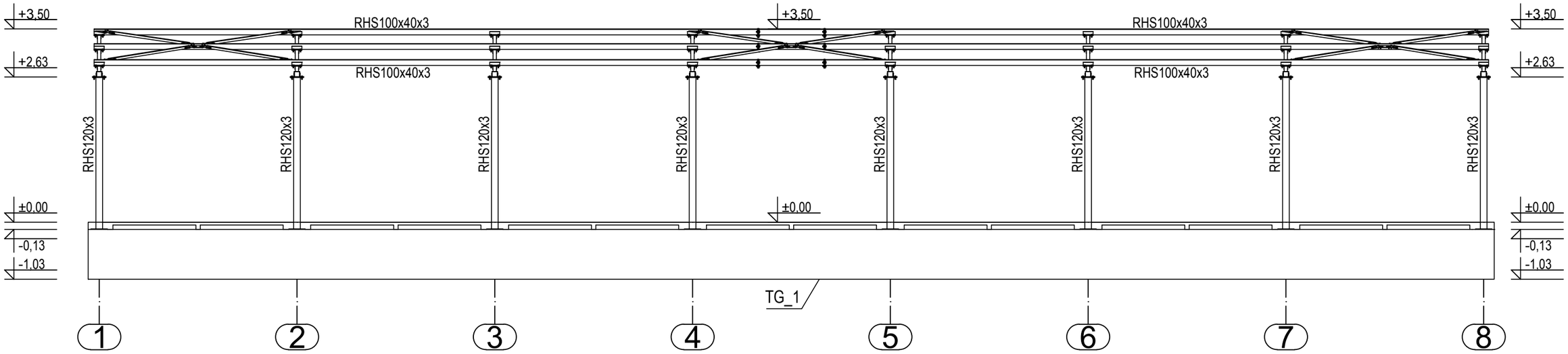


A

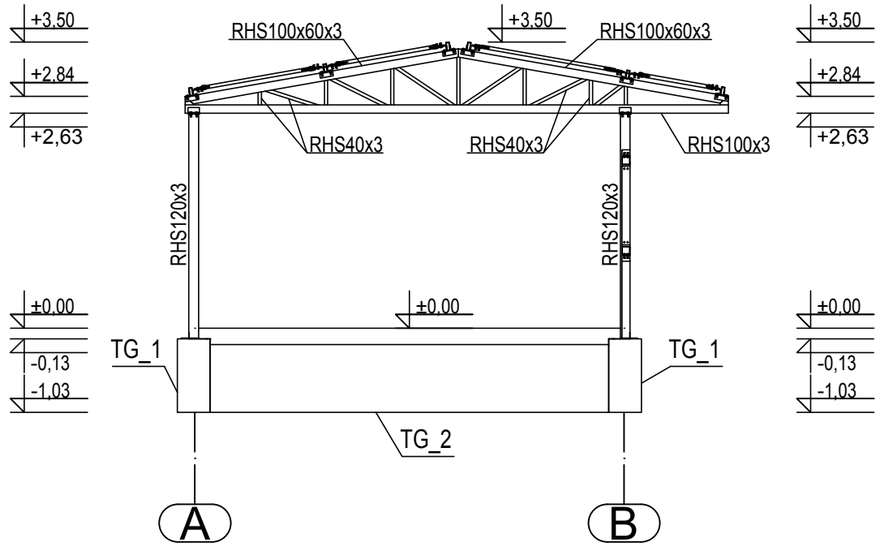
-KER.PLOČICE
-KOŠULJICA 5CM
-TERMOIZOLACIJA 5cm
-HIDROIZOLACIJA
-NABIJENI BETON 8CM
-ŠLJUNAK 10cm
-NABIJENO PODTLO

Investitor: **SHANDONG LUQIAO GROUP CO.LTD OGRANAK BEOGRAD-NOVI BEOGRAD Trg prijateljstva Srbije i Kine br. 4 , Beograd-Novi Beograd**	Kakkk PROJECT
Objekat: **IZGRADNJA PRIVREMENOG KAMPA SA BETONSKIM POGONOM**	
Mesto i adresa gradnje: **br.kat.par.6170, 6171, 6172, 6173, 6174/1, 6174/4, 6174/6 K.O. B.Topola**	Broj projekta: **51 - IDP / 2022**
Vrsta tehničke dokumentacije: **IDP - 2. PROJEKAT KONSTRUKCIJE**	Datum: **Mart 2022 god.**
Naziv crteža: **PRESEK D-D - KANCELARIJE**	Razmera: **R=1:50**
Odgovorni projektant: **Imre Kekenj, mast.inž.građ. br. licence: 310 P025 16**	Kekenj Imre
Saradnik: **Atila Takač građ. tehn.**	Broj lista: **List br. 14**

Konstrukcija u osi A

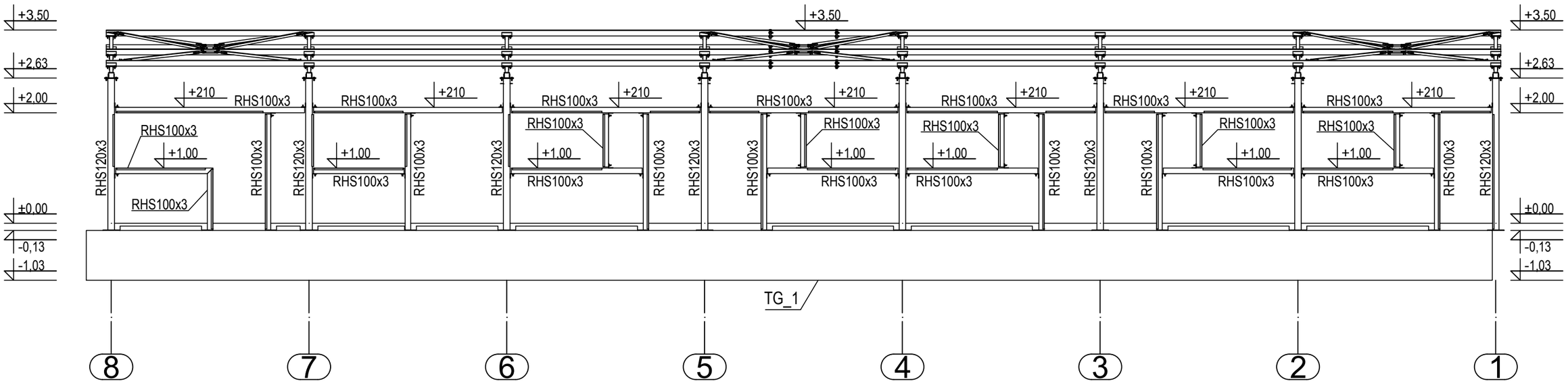


Konstrukcija u osi 1

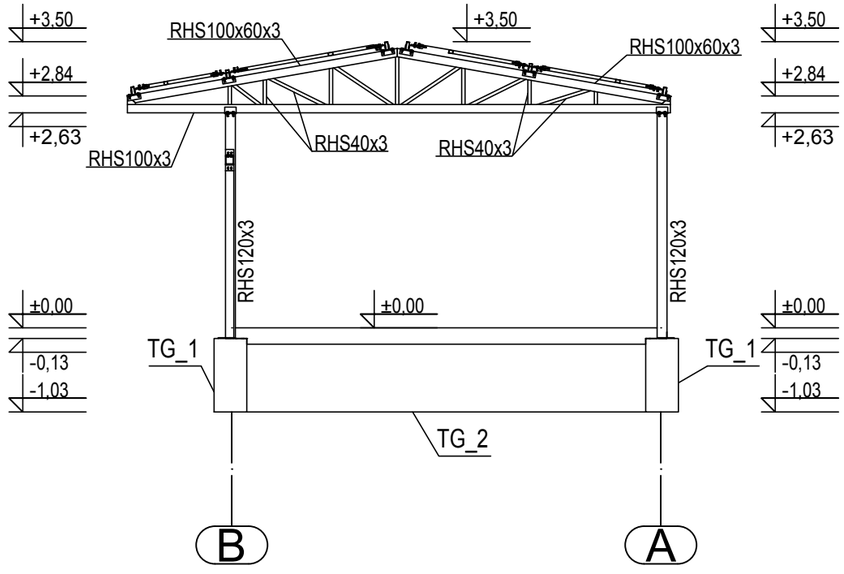


Investitor: **SHANDONG LUQIAO GROUP CO.LTD OGRANAK BEOGRAD-NOVI BEOGRAD Trg prijateljstva Srbije i Kine br. 4 , Beograd-Novi Beograd**	Kakkk PROJECT
Objekat: **IZGRADNJA PRIVREMENOG KAMPA SA BETONSKIM POGONOM**	
Mesto i adresa gradnje: **br.kat.par.6170, 6171, 6172, 6173, 6174/1, 6174/4, 6174/6 K.O. B.Topola**	Broj projekta: **51 - IDP / 2022**
Vrsta tehničke dokumentacije: **IDP - 2. PROJEKAT KONSTRUKCIJE**	Datum: **Mart 2022 god.**
Naziv crteža: **KONSTRUKCIJA U OSI - A , 1 KANCELARIJE**	Razmera: **R=1:75**
Odgovorni projektant: **Imre Kekenj, mast.inž.građ. br. licence: 310 P025 16**	Kekenj Imre
Saradnik: **Atila Takač građ. tehn.**	Broj lista: **List br. 15**

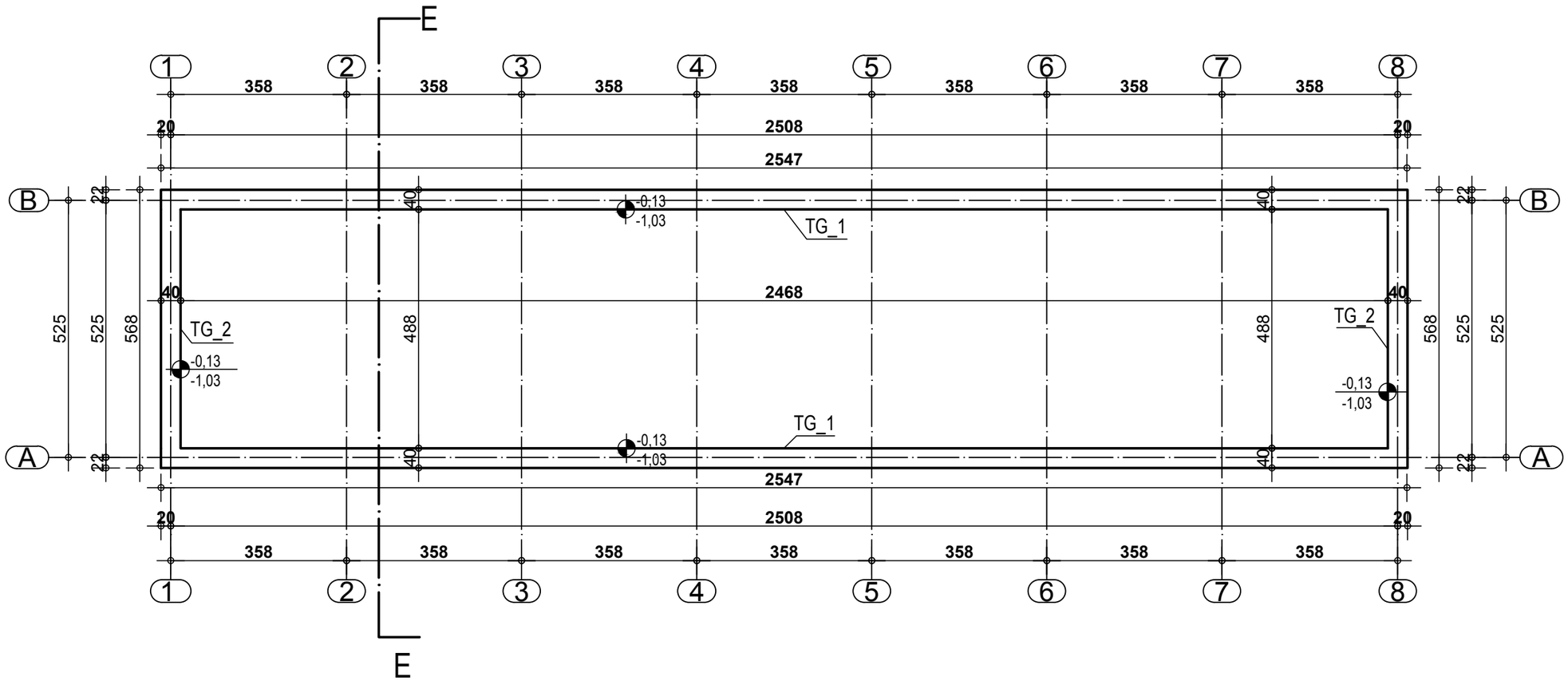
Konstrukcija u osi B



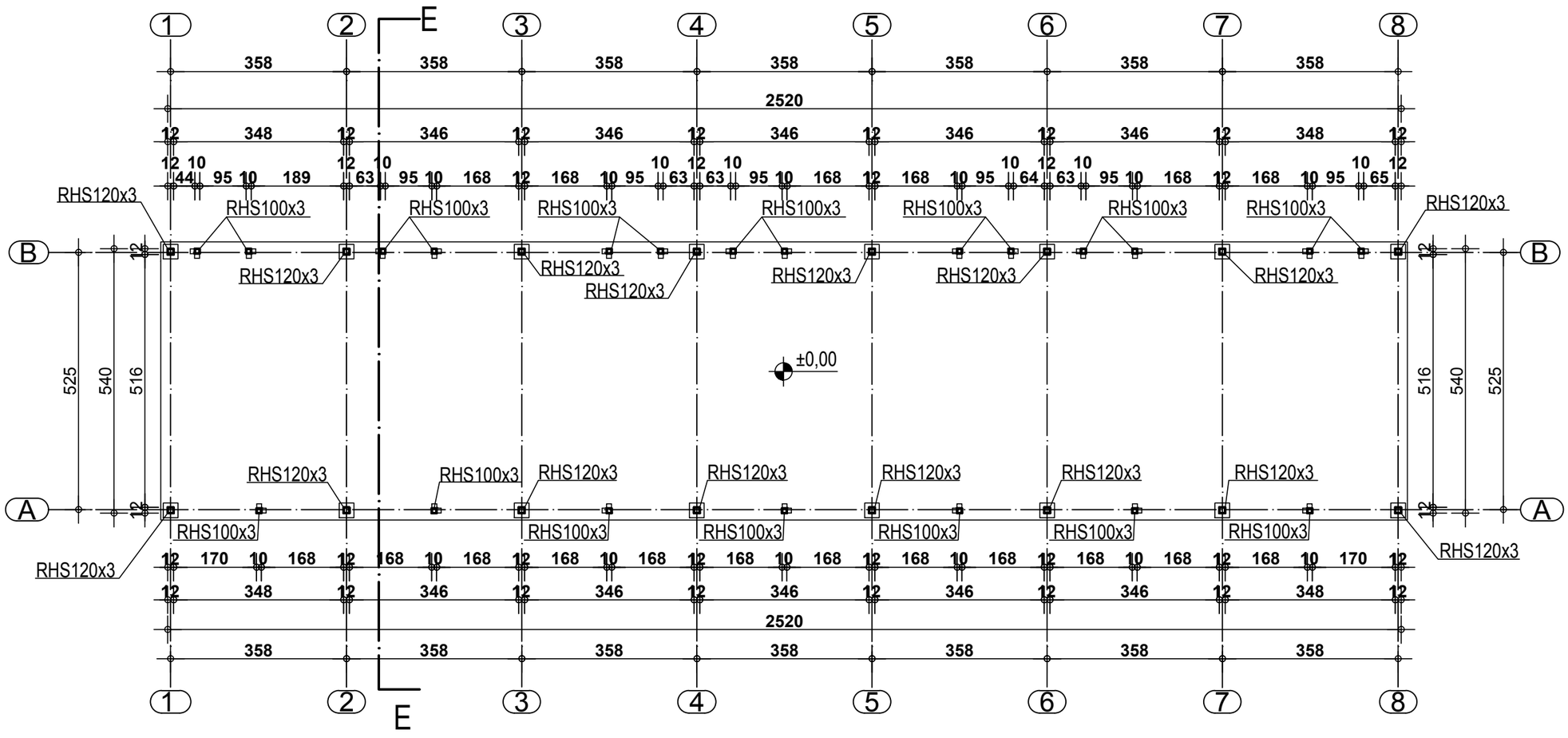
Konstrukcija u osi 8



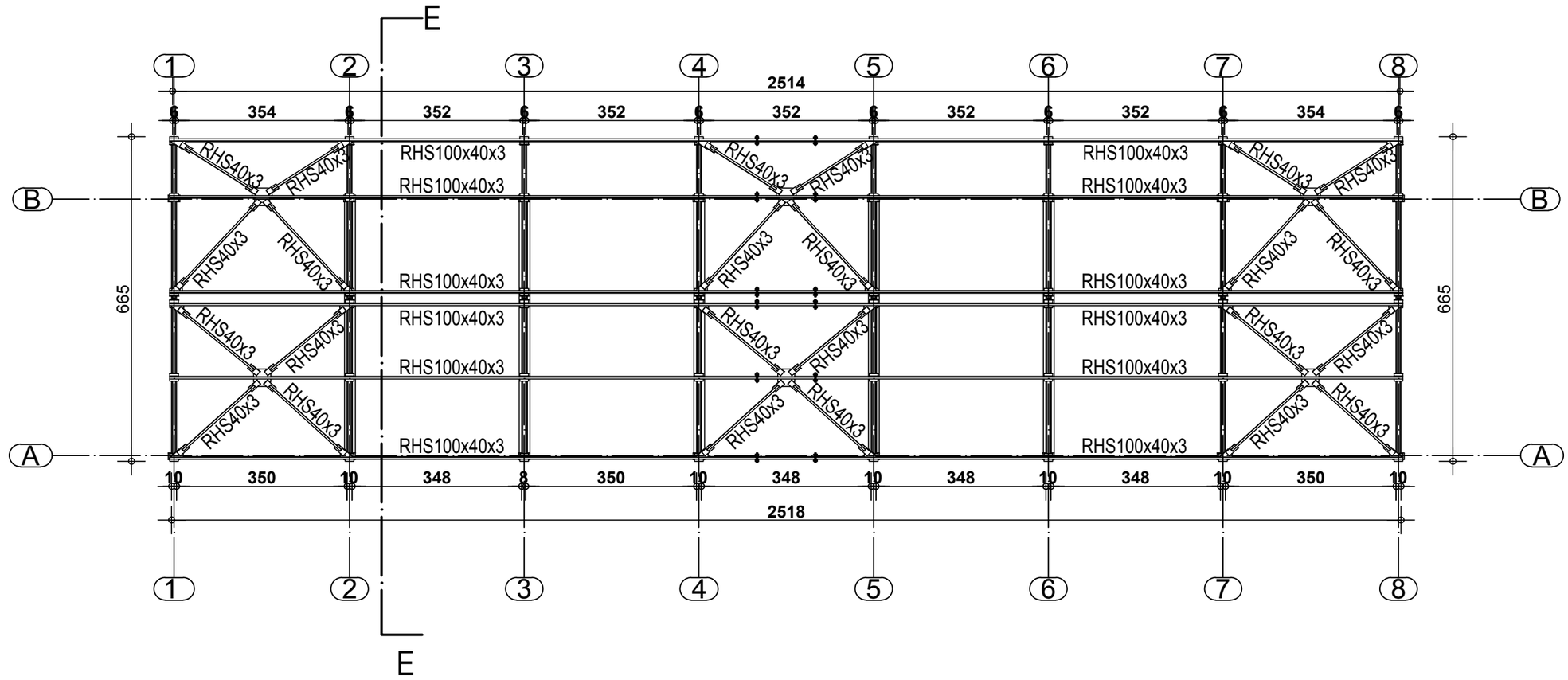
Investitor: **SHANDONG LUQIAO GROUP CO.LTD OGRANAK BEOGRAD-NOVI BEOGRAD Trg prijateljstva Srbije i Kine br. 4 , Beograd-Novi Beograd**	Kakkk PROJECT
Objekat: **IZGRADNJA PRIVREMENOG KAMPA SA BETONSKIM POGONOM**	
Mesto i adresa gradnje: **br.kat.par.6170, 6171, 6172, 6173, 6174/1, 6174/4, 6174/6 K.O. B.Topola**	Broj projekta: **51 - IDP / 2022**
Vrsta tehničke dokumentacije: **IDP - 2. PROJEKAT KONSTRUKCIJE**	Datum: **Mart 2022 god.**
Naziv crteža: **KONSTRUKCIJA U OSI - B , 8 KANCELARIJE**	Razmera: **R=1:75**
Odgovorni projektant: **Imre Kekenj, mast.inž.građ. br. licence: 310 P025 16**	Kekenj Imre
Saradnik: **Atila Takač građ. tehn.**	Broj lista: **List br. 16**



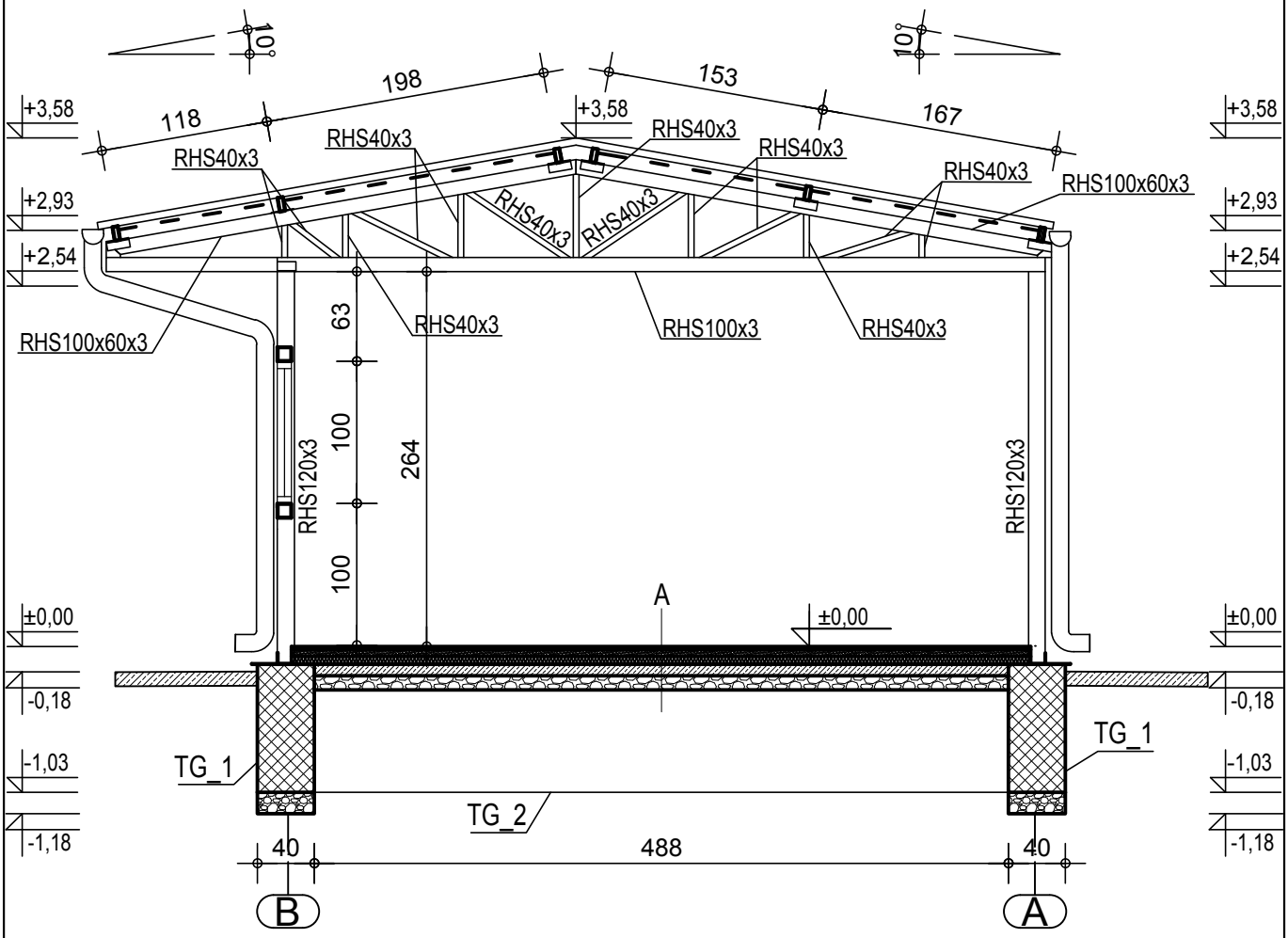
Investitor: **SHANDONG LUQIAO GROUP CO.LTD** **OGRANAK BEOGRAD-NOVI BEOGRAD** **Trg prijateljstva Srbije i Kine br. 4 , Beograd-Novi Beograd**	Kakkk PROJECT
Objekat: **IZGRADNJA PRIVREMENOG KAMPA SA BETONSKIM POGONOM**	
Mesto i adresa gradnje: **br.kat.par.6170, 6171, 6172, 6173, 6174/1, 6174/4, 6174/6 K.O. B.Topola**	Broj projekta: **51 - IDP / 2022**
Vrsta tehničke dokumentacije: **IDP - 2. PROJEKAT KONSTRUKCIJE**	Datum: **Mart 2022 god.**
Naziv crteža: **OSNOVA TEMELJA - SMEŠTAJ RADNIKA**	Razmera: **R=1:100**
Odgovorni projektant: **Imre Kekenj, mast.inž.građ. br. licence: 310 P025 16**	Kekenj Imre
Saradnik: **Atila Takač građ. tehn.**	Broj lista: **List br. 17**



Investitor: **SHANDONG LUQIAO GROUP CO.LTD** **OGRANAK BEOGRAD-NOVI BEOGRAD** **Trg prijateljstva Srbije i Kine br. 4 , Beograd-Novi Beograd**	Kakkk PROJECT
Objekat: **IZGRADNJA PRIVREMENOG KAMPA SA BETONSKIM POGONOM**	
Mesto i adresa gradnje: **br.kat.par.6170, 6171, 6172, 6173, 6174/1, 6174/4, 6174/6 K.O. B.Topola**	Broj projekta: **51 - IDP / 2022**
Vrsta tehničke dokumentacije: **IDP - 2. PROJEKAT KONSTRUKCIJE**	Datum: **Mart 2022 god.**
Naziv crteža: **OSNOVA PRIZEMLJA - SMEŠTAJ RADNIKA**	Razmera: **R=1:100**
Odgovorni projektant: **Imre Kekenj, mast.inž.građ. br. licence: 310 P025 16**	Kekenj Imre
Saradnik: **Atila Takač građ. tehn.**	Broj lista: **List br. 18**



Investitor: **SHANDONG LUQIAO GROUP CO.LTD** **OGRANAK BEOGRAD-NOVI BEOGRAD** **Trg prijateljstva Srbije i Kine br. 4 , Beograd-Novi Beograd**	Kakkk PROJECT
Objekat: **IZGRADNJA PRIVREMENOG KAMPA SA BETONSKIM POGONOM**	
Mesto i adresa gradnje: **br.kat.par.6170, 6171, 6172, 6173, 6174/1, 6174/4, 6174/6 K.O. B.Topola**	Broj projekta: **51 - IDP / 2022**
Vrsta tehničke dokumentacije: **IDP - 2. PROJEKAT KONSTRUKCIJE**	Datum: **Mart 2022 god.**
Naziv crteža: **OSNOVA KROVA - SMEŠTAJ RADNIKA**	Razmera: **R=1:100**
Odgovorni projektant: **Imre Kekenj, mast.inž.građ. br. licence: 310 P025 16**	Kekenj Imre
Saradnik: **Atila Takač građ. tehn.**	Broj lista: **List br. 19**

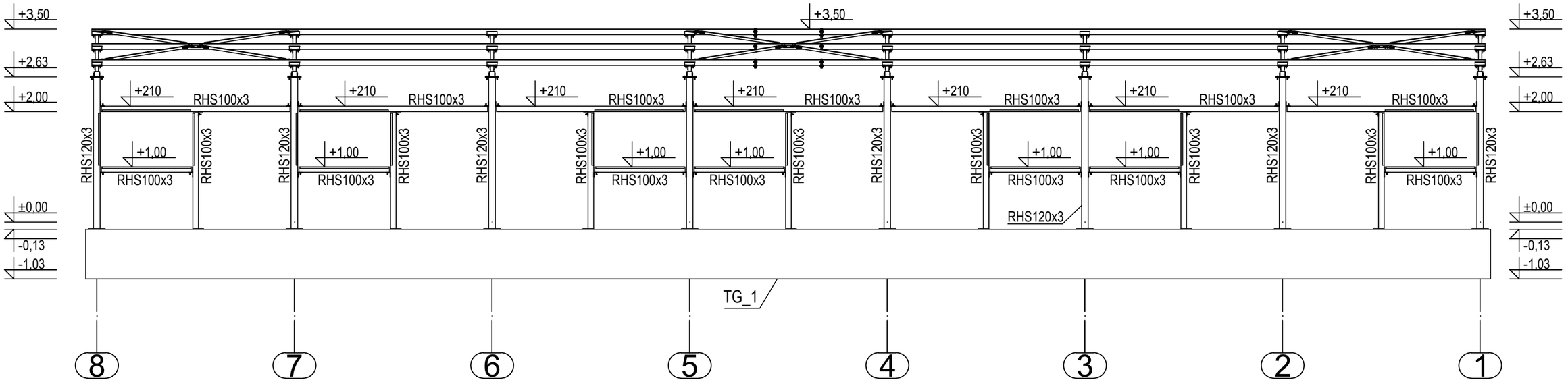


A

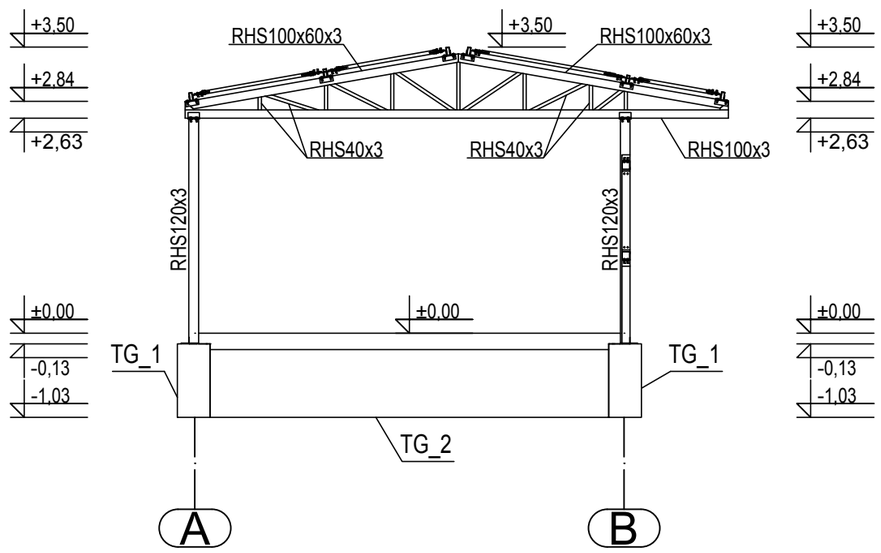
-KER.PLOČICE
-KOŠULJICA 5CM
-TERMOIZOLACIJA 5cm
-HIDROIZOLACIJA
-NABIJENI BETON 8CM
-ŠLJUNAK 10cm
-NABIJENO PODTLO

Investitor: **SHANDONG LUQIAO GROUP CO.LTD OGRANAK BEOGRAD-NOVI BEOGRAD Trg prijateljstva Srbije i Kine br. 4 , Beograd-Novi Beograd**	Kakkk PROJECT
Objekat: **IZGRADNJA PRIVREMENOG KAMPA SA BETONSKIM POGONOM**	
Mesto i adresa gradnje: **br.kat.par.6170, 6171, 6172, 6173, 6174/1, 6174/4, 6174/6 K.O. B.Topola**	Broj projekta: **51 - IDP / 2022**
Vrsta tehničke dokumentacije: **IDP - 2. PROJEKAT KONSTRUKCIJE**	Datum: **Mart 2022 god.**
Naziv crteža: **PRESEK E-E - SMEŠTAJ RADNIKA**	Razmera: **R=1:50**
Odgovorni projektant: **Imre Kekenj, mast.inž.građ. br. licence: 310 P025 16**	Kekenj Imre
Saradnik: **Atila Takač građ. tehn.**	Broj lista: **List br. 20**

Konstrukcija u osi A

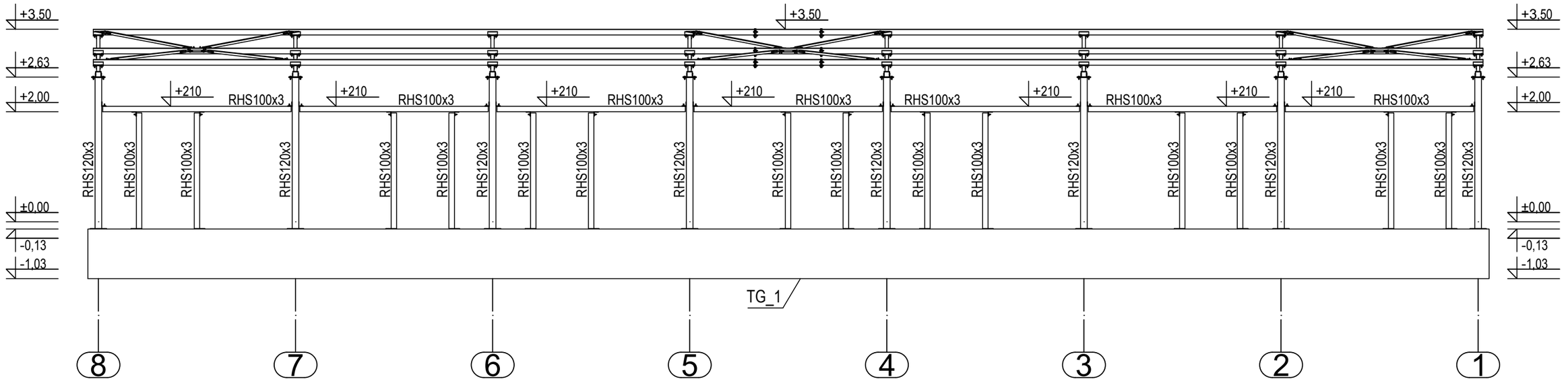


Konstrukcija u osi 1

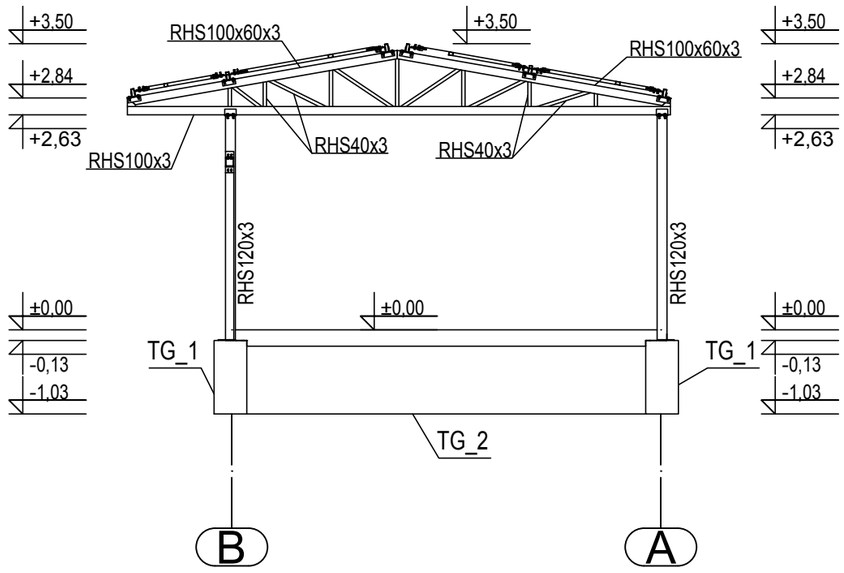


Investitor: **SHANDONG LUQIAO GROUP CO.LTD OGRANAK BEOGRAD-NOVI BEOGRAD Trg prijateljstva Srbije i Kine br. 4 , Beograd-Novi Beograd**	Kakkk PROJECT
Objekat: **IZGRADNJA PRIVREMENOG KAMPA SA BETONSKIM POGONOM**	
Mesto i adresa gradnje: **br.kat.par.6170, 6171, 6172, 6173, 6174/1, 6174/4, 6174/6 K.O. B.Topola**	Broj projekta: **51 - IDP / 2022**
Vrsta tehničke dokumentacije: **IDP - 2. PROJEKAT KONSTRUKCIJE**	Datum: **Mart 2022 god.**
Naziv crteža: **KONSTRUKCIJA U OSI - A , 1 SMEŠTAJ RADNIKA**	Razmera: **R=1:75**
Odgovorni projektant: **Imre Kekenj, mast.inž.građ. br. licence: 310 P025 16**	Kekenj Imre
Saradnik: **Atila Takač građ. tehn.**	Broj lista: **List br. 21**

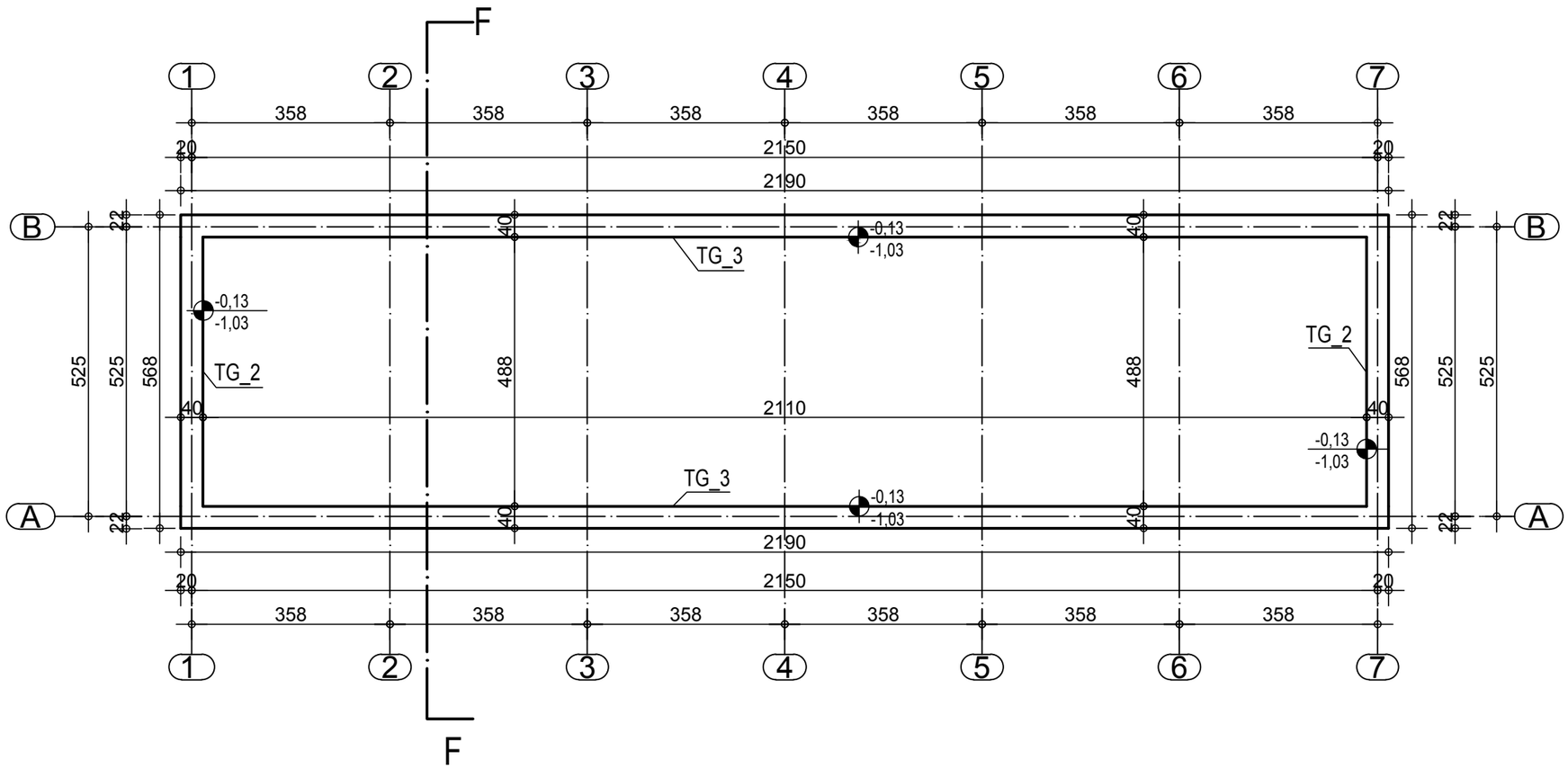
Konstrukcija u osi B



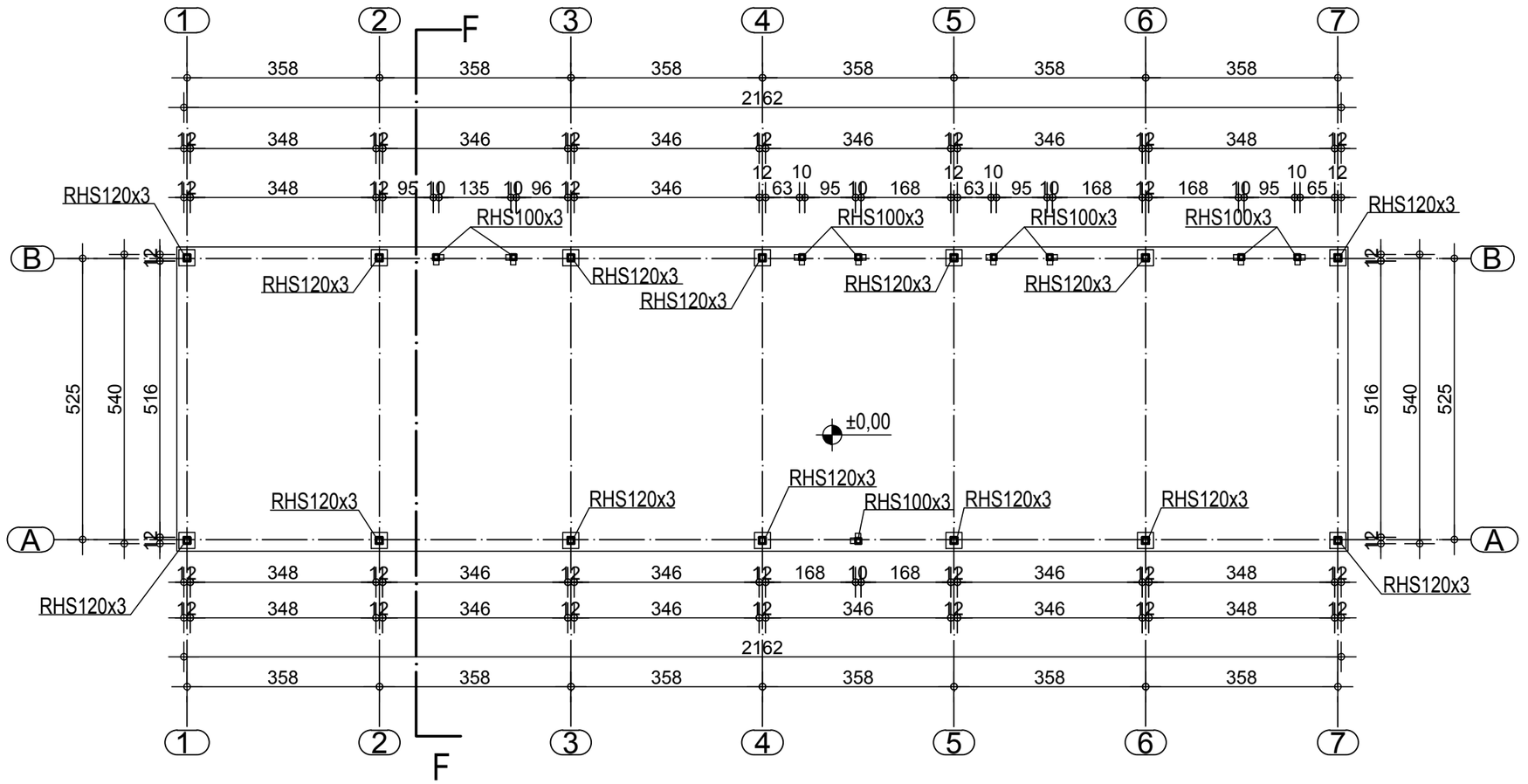
Konstrukcija u osi 8



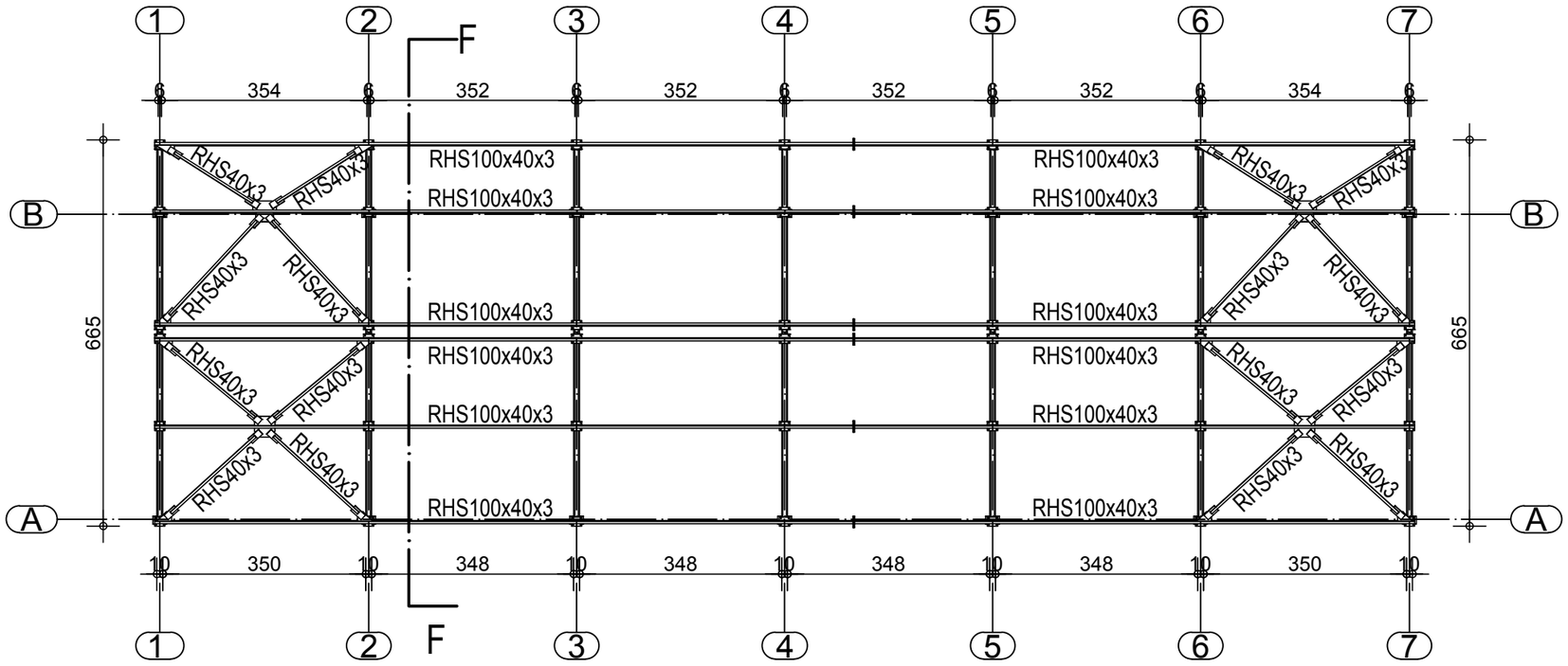
Investitor: **SHANDONG LUQIAO GROUP CO.LTD OGRANAK BEOGRAD-NOVI BEOGRAD Trg prijateljstva Srbije i Kine br. 4 , Beograd-Novi Beograd**	Kakkk PROJECT
Objekat: **IZGRADNJA PRIVREMENOG KAMPA SA BETONSKIM POGONOM**	
Mesto i adresa gradnje: **br.kat.par.6170, 6171, 6172, 6173, 6174/1, 6174/4, 6174/6 K.O. B.Topola**	Broj projekta: **51 - IDP / 2022**
Vrsta tehničke dokumentacije: **IDP - 2. PROJEKAT KONSTRUKCIJE**	Datum: **Mart 2022 god.**
Naziv crteža: **KONSTRUKCIJA U OSI - B , 8 SMEŠTAJ RADNIKA**	Razmera: **R=1:75**
Odgovorni projektant: **Imre Kekenj, mast.inž.građ. br. licence: 310 P025 16**	Kekenj Imre
Saradnik: **Atila Takač građ. tehn.**	Broj lista: **List br. 22**



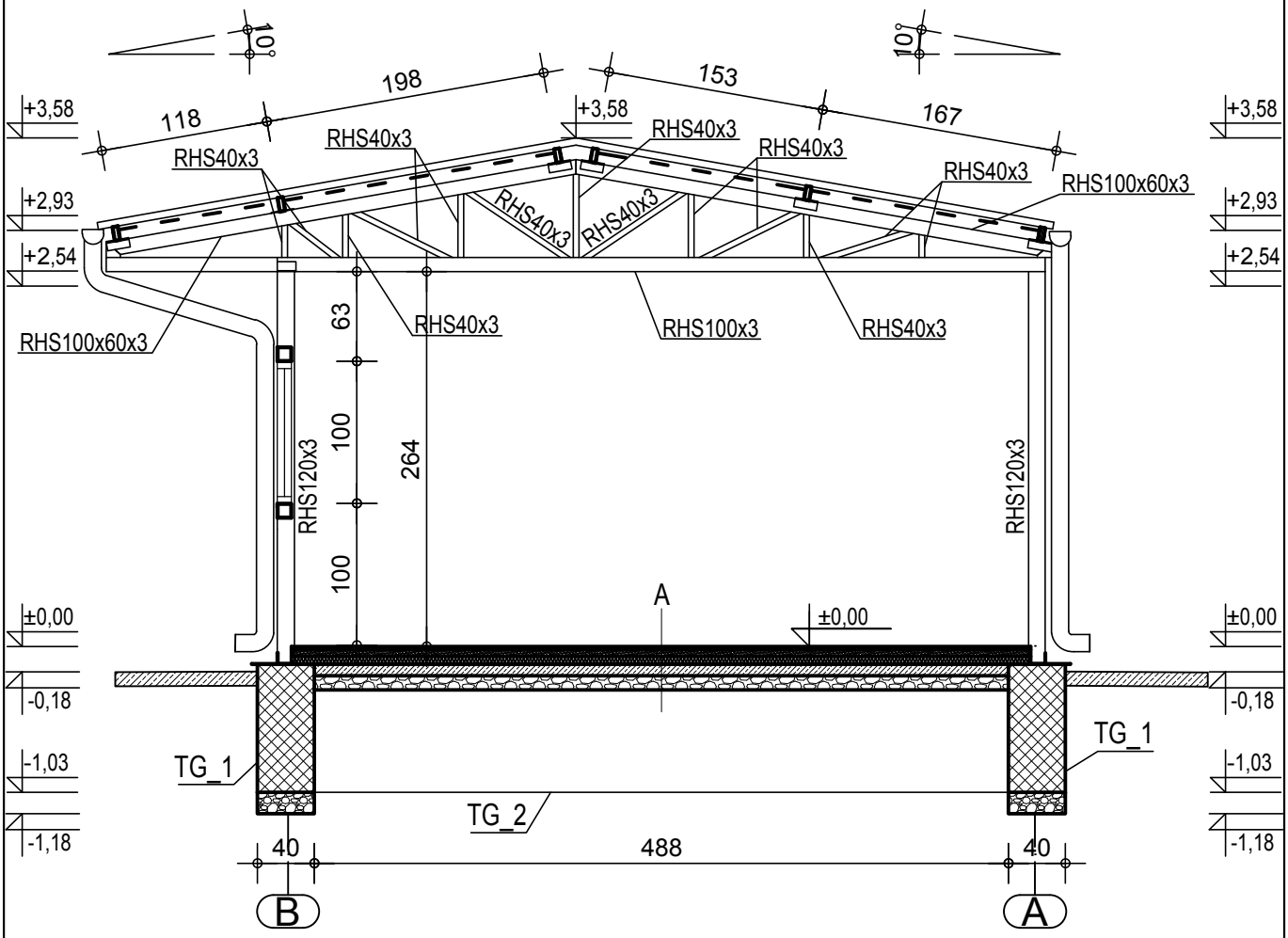
Investitor: **SHANDONG LUQIAO GROUP CO.LTD** **OGRANAK BEOGRAD-NOVI BEOGRAD** **Trg prijateljstva Srbije i Kine br. 4 , Beograd-Novi Beograd**	Kakkk PROJECT
Objekat: **IZGRADNJA PRIVREMENOG KAMPA SA BETONSKIM POGONOM**	
Mesto i adresa gradnje: **br.kat.par.6170, 6171, 6172, 6173, 6174/1, 6174/4, 6174/6 K.O. B.Topola**	Broj projekta: **51 - IDP / 2022**
Vrsta tehničke dokumentacije: **IDP - 2. PROJEKAT KONSTRUKCIJE**	Datum: **Mart 2022 god.**
Naziv crteža: **OSNOVA TEMELJA - SANITARNI BLOK**	Razmera: **R=1:100**
Odgovorni projektant: **Imre Kekenj, mast.inž.građ. br. licence: 310 P025 16**	Kekenj Imre
Saradnik: **Atila Takač građ. tehn.**	Broj lista: **List br. 23**



Investitor: **SHANDONG LUQIAO GROUP CO.LTD** **OGRANAK BEOGRAD-NOVI BEOGRAD** **Trg prijateljstva Srbije i Kine br. 4 , Beograd-Novi Beograd**	Kakkk PROJECT
Objekat: **IZGRADNJA PRIVREMENOG KAMPA SA BETONSKIM POGONOM**	
Mesto i adresa gradnje: **br.kat.par.6170, 6171, 6172, 6173, 6174/1, 6174/4, 6174/6 K.O. B.Topola**	Broj projekta: **51 - IDP / 2022**
Vrsta tehničke dokumentacije: **IDP - 2. PROJEKAT KONSTRUKCIJE**	Datum: **Mart 2022 god.**
Naziv crteža: **OSNOVA PRIZEMLJA - SANITARNI BLOK**	Razmera: **R=1:100**
Odgovorni projektant: **Imre Kekenj, mast.inž.građ. br. licence: 310 P025 16**	Kekenj Imre
Saradnik: **Atila Takač građ. tehn.**	Broj lista: **List br. 24**



Investitor: **SHANDONG LUQIAO GROUP CO.LTD** **OGRANAK BEOGRAD-NOVI BEOGRAD** **Trg prijateljstva Srbije i Kine br. 4 , Beograd-Novi Beograd**	Kakkk PROJECT
Objekat: **IZGRADNJA PRIVREMENOG KAMPA SA BETONSKIM POGONOM**	
Mesto i adresa gradnje: **br.kat.par.6170, 6171, 6172, 6173, 6174/1, 6174/4, 6174/6 K.O. B.Topola**	Broj projekta: **51 - IDP / 2022**
Vrsta tehničke dokumentacije: **IDP - 2. PROJEKAT KONSTRUKCIJE**	Datum: **Mart 2022 god.**
Naziv crteža: **OSNOVA KROVA - SANITARNI BLOK**	Razmera: **R=1:100**
Odgovorni projektant: **Imre Kekenj, mast.inž.građ. br. licence: 310 P025 16**	Kekenj Imre
Saradnik: **Atila Takač građ. tehn.**	Broj lista: **List br. 25**

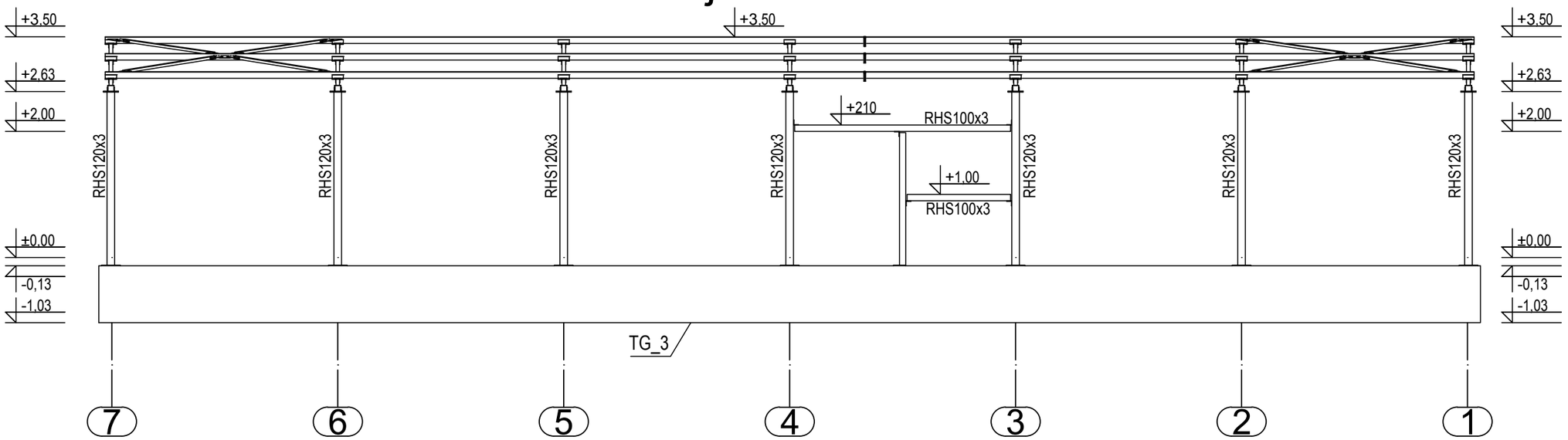


A

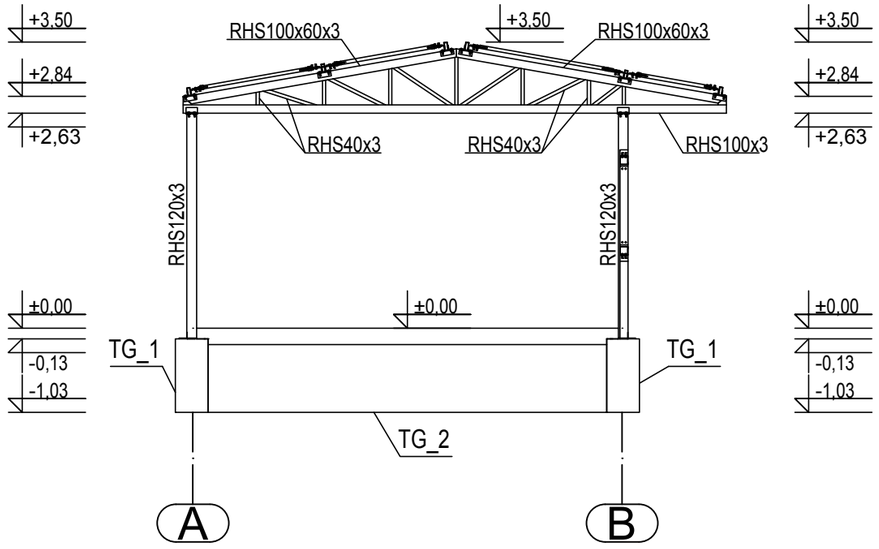
-KER.PLOČICE
-KOŠULJICA 5CM
-TERMOIZOLACIJA 5cm
-HIDROIZOLACIJA
-NABIJENI BETON 8CM
-ŠLJUNAK 10cm
-NABIJENO PODTLO

Investitor: **SHANDONG LUQIAO GROUP CO.LTD OGRANAK BEOGRAD-NOVI BEOGRAD Trg prijateljstva Srbije i Kine br. 4 , Beograd-Novi Beograd**	Kakkk PROJECT
Objekat: **IZGRADNJA PRIVREMENOG KAMPA SA BETONSKIM POGONOM**	
Mesto i adresa gradnje: **br.kat.par.6170, 6171, 6172, 6173, 6174/1, 6174/4, 6174/6 K.O. B.Topola**	Broj projekta: **51 - IDP / 2022**
Vrsta tehničke dokumentacije: **IDP - 2. PROJEKAT KONSTRUKCIJE**	Datum: **Mart 2022 god.**
Naziv crteža: **PRESEK F-F - SANITARNI BLOK**	Razmera: **R=1:50**
Odgovorni projektant: **Imre Kekenj, mast.inž.građ. br. licence: 310 P025 16**	Kekenj Imre
Saradnik: **Atila Takač građ. tehn.**	Broj lista: **List br. 26**

Konstrukcija u osi A

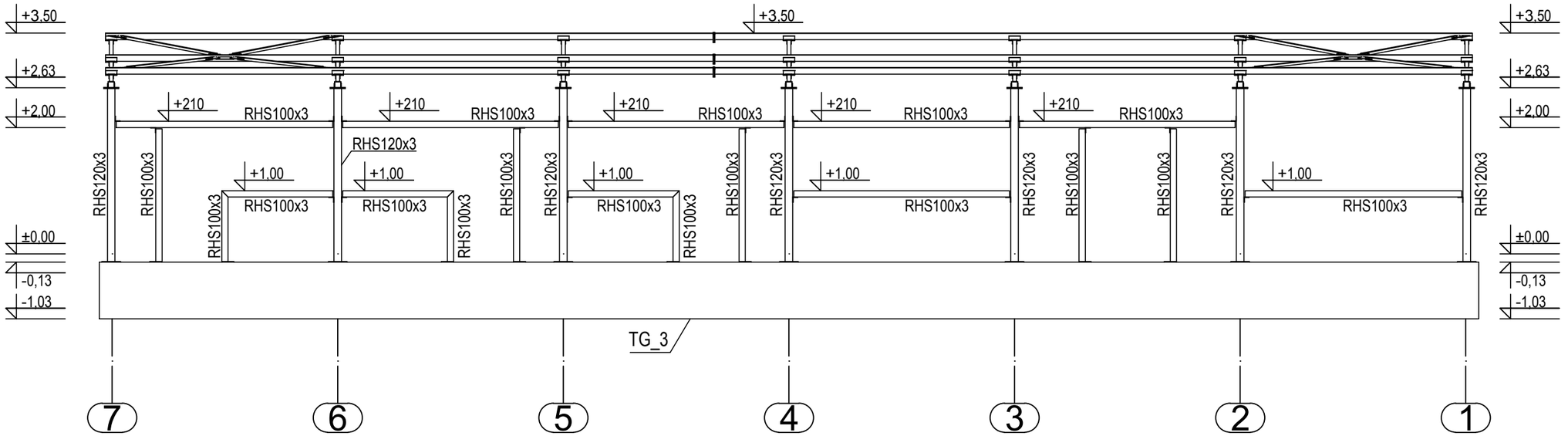


Konstrukcija u osi 1

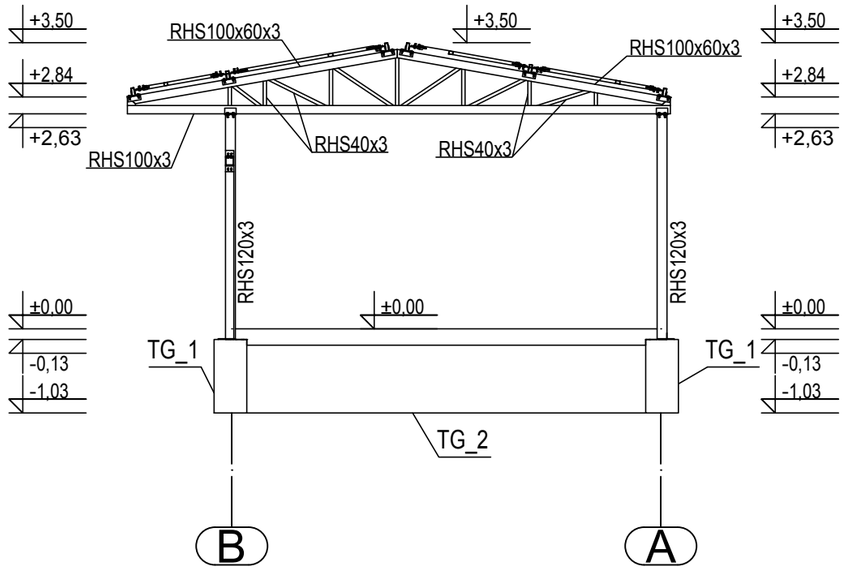


Investitor: **SHANDONG LUQIAO GROUP CO.LTD OGRANAK BEOGRAD-NOVI BEOGRAD Trg prijateljstva Srbije i Kine br. 4 , Beograd-Novi Beograd**	Kakkk PROJECT
Objekat: **IZGRADNJA PRIVREMENOG KAMPA SA BETONSKIM POGONOM**	
Mesto i adresa gradnje: **br.kat.par.6170, 6171, 6172, 6173, 6174/1, 6174/4, 6174/6 K.O. B.Topola**	Broj projekta: **51 - IDP / 2022**
Vrsta tehničke dokumentacije: **IDP - 2. PROJEKAT KONSTRUKCIJE**	Datum: **Mart 2022 god.**
Naziv crteža: **KONSTRUKCIJA U OSI - A , 1 SANITARNI BLOK**	Razmera: **R=1:75**
Odgovorni projektant: **Imre Kekenj, mast.inž.građ. br. licence: 310 P025 16**	Kekenj Imre
Saradnik: **Atila Takač građ. tehn.**	Broj lista: **List br. 27**

Konstrukcija u osi B



Konstrukcija u osi 7



Investitor: **SHANDONG LUQIAO GROUP CO.LTD OGRANAK BEOGRAD-NOVI BEOGRAD Trg prijateljstva Srbije i Kine br. 4 , Beograd-Novi Beograd**	Kakkk PROJECT
Objekat: **IZGRADNJA PRIVREMENOG KAMPA SA BETONSKIM POGONOM**	
Mesto i adresa gradnje: **br.kat.par.6170, 6171, 6172, 6173, 6174/1, 6174/4, 6174/6 K.O. B.Topola**	Broj projekta: **51 - IDP / 2022**
Vrsta tehničke dokumentacije: **IDP - 2. PROJEKAT KONSTRUKCIJE**	Datum: **Mart 2022 god.**
Naziv crteža: **KONSTRUKCIJA U OSI - B , 7 SANITARNI BLOK**	Razmera: **R=1:75**
Odgovorni projektant: **Imre Kekenj, mast.inž.građ. br. licence: 310 P025 16**	Kekenj Imre
Saradnik: **Atila Takač građ. tehn.**	Broj lista: **List br. 28**